

Impact of Cloud Computing in E-Learning: A Study

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Abstract-

Objectives: Increase in the demand of e-learning initiate the need of cloud based e-learning. Review of all cloud based e-learning systems is provided which can be used to develop better e-learning systems. **Method/Analysis:** E-learning is less steep and easy way to study and discover but still due to need of lot of IT capabilities and infrastructure it is still not so famous in India, with the exploit of cloud computing it can be made more accessible and constructive. A wide survey has been carrying out with more than sixty papers. Each paper was studied in detail and their shortcomings were analysed to give a better idea what to do in future.

Findings: It was pragmatic that e-learning solutions are several but cloud based solutions have many shortcomings like sanctuary, contents, services etc. which needs to be addressed.

Improvement: While a lot of papers have been studied but still additional papers can be consider and a system can be created in future based on the interpretation of the systems.

Keywords: *Cloud Computing, E-Learning.*

I. Introduction:

In a developing nation like India where literacy pace is not as per the requisite, e-learning is a solution. But lots of factors like technological sustain, finance, infrastructure, and logistics etc. are obstruction in the path. Cloud computing in e-learning is the solution for this. This paper provided a complete survey of the prior work done in the area of cloud based e-learning. It also compares these works and give the annotations and findings which can be used by researchers to come forward for the solutions in this field.

II. Survey:

A. Based on Resources

¹It highlights a little meanings of cloud computing and e-learning and it also elaborated about architectures, needs and benefits of cloud. Education institutions are quickly considering and cloud based e-learning is followed. By the cloud based e-learning various education institutions take the advantage of this technology by deploying various applications on it. As per conventional e-learning cloud computing provides all hardware and software resources to current e-learning system on demand without any high cost. So this major factor which forced current users to implement e-learning on cloud.²A cloud computing service can have ubiquitous admittance through portable devices and applications provided by cloud service providers. Cloud computing has many benefits in edification, The main benefit is cost efficacy for the execution of the hardware and software

and this technology can advance superiority of current system of edification at an reasonable cost.³ The study gives an outline of the concepts and organization of cloud computing and its possible value as a podium for e-learning. Although being in their untimely stages of growth, author on the other hand squabble their confluence will provide access to and enabling surroundings for release of effectual and eminence knowledge.⁴Cloud computing as blend of existed technology which provides various resources on demand in low cost. Cloud computing provides various services and permit their own students to carry out studious work.⁵In discussed about what could be done to enhance the benefits for students and faculty. In current scenario, the role of e-learning is increased day by day. It describes the various features of cloud computing, there impact and its architecture. By combining all these factors it showed the importance of cloud computing in online education. E-learning focuses on the technology to alter & direct education.⁶E-learning system will make use of the cloud computing that introduces proficient scale mechanism. In this author brings cloud computing to e-learning from the subsequent aspects: its work manner, services, business replica, benefits & issues. Its results propose that the preamble of cloud computing to elearning is realistic & to bring greater transparency regarding cloud computing benefits.⁷By the way of Education and learning (ELAAS) author includes in this paper the benefits and advancements of cloud based web learning.⁸It provides the importance of cloud in online learning development. It showed the cloud based

solutions and development association for online learning which confronts when this architecture is utilized.⁹It showed the contribution of E-Learning standards with the Cloud standards and the brunt on using cloud based online learning services. The studied was carried out through a comparison between e learning systems before and after moving to Cloud Computing environment by taking cloud based online education systems. Cloud computing is providing the underlying technology that backings, and hosts such structures.¹⁰It delivers some advantages and problems of online cloud based learning. Online learning future prospects are also discussed.¹¹Problem that can arise in the online learning use, today is more likely to institution building their own e-learning system itself. An advantage of cloud based online learning is considered in this.¹²Many educational institutions do not have the ability to afford such resources and/or infrastructures required for their online learning systems and are planning for cloud based services. Advantages and shortcomings of cloud based e-learning were discussed earlier.¹³The current e-learning systems drawbacks are the inappropriate infrastructures & non efficiency integrated Application Model. The combination of various technologies are proposed to achieve this particular objective. It also explains about the need of the online learning Design features and analysis the need of cloud computing.¹⁴Cloud-based Learning Management Systems availability rate is very high, providing services for collaborating, evaluating and creating learning content. To evaluate and compare some of the cloud-based LMSs is the aim of the current work. For estimating the advantages and disadvantages of cloud-based systems for web based learning the LMSs common way is applied.¹⁵An e-learning model composes of a course website and multimedia learning modules. By using cloud computing resources such as Google Apps, YouTube and SkyDrive to remodel and execute the online learning model on cloud. This paper discusses the change of online learning portal from a traditional hosting platform to a cloud computing platform. By using the resources such as Google Apps and the hosting of multimedia modules using SkyDrive and YouTube are explored.¹⁶In education and training area E-learning has now become an indispensable part of various sectors from academia to industry. In this paper, author elaborate a new manner of e-learning, it presented cloud computing technology service factor. SaaS is mainly focused in this framework.¹⁷It combines online learning with cloud for mostly students who are dependent of web based learning. It provides the cloud based web learning solutions for faculty and student learners.¹⁸This paper focused on Problem-based learning approach by which students can improve their all skills related to their subjects. It helps the engineering alumni to employ in lifelong learning process. It also promotes problem solving, interactions, and team-working skills. The use of cloud in online learning system helps to achieve scalability,

anywhere access, persistent storage, and well-organized resource usage.¹⁹Cloud computing provides various services to users by which various Academic institutions take advantage of accessible cloud-based applications offered by service as a resource and empower their own students to implement academic tasks. In this paper, author includes the benefits of cloud for students and for the teachers.²⁰Scalable and virtualized resources are achieved with cloud model. Electronic learning based on cloud provides a lot of benefits to the students to fulfilled their subjects needs. In this editorial service oriented cloud computing architecture is used to transmit E-learning into the cloud. It covers challenges like: scalability, application development, efficient use of resources, saving disbursement, and security.²¹They made an attempt to show an e-learning cloud. By the analyses and reviewing of framework of online learning and cloud, it strongly propose the fact of merger of cloud and online education. By using critical technologies, Self-Organizing network, Intelligence Resource Access Control Policy Numerous, cloud computing services and Negotiation-based Content Provider, e-learning cloud implements different educating cross-system based on pedagogical approaches.

B. Based on Architecture

²²In a cloud based e-learning framework was introduced for education zone. It presented a comparative study of proposed architecture with the existing one to divulge the betterments of the proffered architecture over the present one.²³This presents a lucid idea how e- resources are allocated dynamically in a cloud environment. It clearly depicts the synopsis of dynamic resource allocation strategies used in e learning. The study is done to traverse over the problems in the resource allotment such as resource contention, resource fragmentation. It also trims down network traffic and internet explodes crowd exertion that is presented in the cloud. Its architecture comprises three key parts and they are Workload Analyser, Priority Scheduler and Accountability Monitor. Workload Analyser predicts the busy workloads from the client requests. For the planning of user request Priority Scheduler is used. To stimulate the cost for the requisite resources in a vibrant resource allocation, accounting monitor is utilized.²⁴It introduces a novel model for harnessing cloud computing infrastructure within an e-learning bionetwork. The main goal was to design a scalable, consistent and secure IT surroundings that provides a all resources to the users. Online learning are modified to promote courses for IT engineers in the vicinity of mobile technologies, societal computing, Internet of things and big data. In e-business Lab, University of Belgrade this model is analysed and practically executed.²⁵It, mapping of the user's requested Virtual Machine (VM) composition exactly with host composition is done using Three Phase Filtering Protocol (3FPF). Also For equally distribution of load on host machineries on the basis of last

virtual machinery executed time and date a competent time based load balancer algorithm is manufactured. By the cloud test bed performance of the proposed algorithm is analyzed.²⁶According to , a novel model is predictable for semantic based content storing of E-Learning equipments on the cloud. E-content here adduces to compilation of text, audio and video trimmings. Text documents alone are separated out. LDA (Latent Dirichlet Algorithm) technique is applied, to wrest the relevant keywords from the learning stuff. The e-content materials, including text materials are segmented into learning stuff. Each learning object is represented as a mixture of topics, and is allied with a likelihood allowance representing connotation of the topic for that e-content. The extracted topics are coordinated with the domain arrangement to get their analogous topic levels. Finally on the basis of the semantics of the e-content Metadata is generated and in storehouse it is kept. This meta data which is available on the cloud behave as a semantic metadata and helps in effectual retrieval of e-content resources. The comparison of recital of semantic based e-content storage on the cloud is done with primordial methods.²⁷Thus, it is proposed a Cloud-Oriented Green Computing Architecture for eLearning Applications (COGALA). By using COGALA in e-learning applications can lower expenses, energy consumption is also reduced, and help organizations with limited IT resources to deploy and maintain needed software in a timely manner. It also discussed the implication of this solution for future research directions to enable Cloud-Oriented Green Computing.²⁸An overview of a number of steps for scholastic institutes as well as organizations to approve cloud computing, a framework was designed by taking into account the array of tactical issues and technological factors from a broad cross section area of proficiency in order to guarantee an adoption of booming cloud computing.²⁹It is possible by the strengths of a cloud service to append value to the learning process for all stakeholders. By this solution, the collecting, analyzing and interpreting data process becomes rather easily. In order to create for primary class students digitalized forms of exercise books, To gain acceptance by such idea additional features have to be added. EPUB, the invention of new e-book standards, in its version 3.0 makes it possible to generate those additional features.³⁰It also explains about the need of the online learning Design features and analysis the need of cloud computing. It proposed the architecture which is based on cloud which includes the cloud based online learning solutions for project management and its advantages.³¹Online learning based on cloud based provides new blended learning methodologies for education. In this paper, to present a new era in e-learning an academic cloud outline is proposed. This framework addresses the services and deployment of cloud in a new aspect and crucial components needed to assemble and academic cloud in a university is specified in each layer.³² It includes the features of e-learning and then correlate with

cloud , it also includes about its architecture by designing online learning cloud based model it invents a new dynamic area by exploring the external interface for users.³³In this the concept of cloud is applied on Indonesia Open Educational Resources (IOER) by following various phase like analysis,design ,execution and testing etc.Its framework includes various layers like (1) Infrastructure, (2) Platform, (3) Application, (4) Service, (5) Access, (6) User. For Indonesia – Virtual Open Learning System (iVOLS) it generated the prototype.³⁴By the proposed cloud based ICT architecture for Indonesia Open Educational Resources (IOER) the resulted are achieved are as it open learning investment of 35.61% efficiency, 60.95% are amplify return on investment and 81.97% are increase in benefits from the user point of view.³⁵This paper represented the “Education and Learning as a Service” (ELaaS) by combing cloud with this is become very useful for education sector .It provides the various solutions for the problems faced by cloud and it also showed the various advantages of these solutions.³⁶It contains all needs like: electronic learning systems, requirements in general, pedagogical requirements, technical requirements including non-functional requirements, to fulfilled all these it proposed online learning cloud based belongings.³⁷Cloud computing approach relies on a number of existing technologies, such as Web2.0, virtualization, Service oriented architecture (SOA), web services, etc. However, today's technologies (such as web 2.0, Cloud, etc.) facilitate to build more effectual educational environment. Cloud computing and Web2.0 are two areas that initiate effect how the development, deployment and usage of e- Learning application is happened. It presented integration of cloud computing with web 2.0 technologies with e-learning environment.³⁸In this Personal Learning Environment Box (PLEBOX) is analyzed in order to recommend an architectural relocation to advance the current PLEBOX clarification into an new type of cloud based online learning platform. It also recommends a set of innovations to be applied on existing business, service replica and cloud architectures to explore cloud based environments.³⁹They focused on cloud based online wisdom games that can be accessed through mobile devices to boost students' learning anytime and anywhere. The proposed model is adaptive and exceedingly portable that can be effortlessly customized to any existing cloud platform. Besides its anticipated framework, It also allowed course instructors or game designers to mutate any ingredient of an e-learning game, and incessantly supervise the performance of individuals who strive to compete with each other to attain superior outcomes. This paper reports an on-going work, specifically the iGame@Cloud system, for which a thorough evaluation will be conducted afterwards.⁴⁰Cloud based education provides a new solution to establish a unified, open and flexible network teaching platform and reduce the hardware input. In this paper, about various providers like Microsoft, Google, Amazon, IBM etc. and various definitions

of cloud are discussed, the rise of cloud in education is included, private cloud based architecture and benefits from these are represented. By using cloud in education institution increase the benefits of students, teachers and administrators through the E-learning architecture.

C. Based On Security

⁴¹Cloud computing advancements in recent years has brought the awareness of immeasurable edification institutions to like its benefits. Cloud computing provides services and storage through the internet. Various cloud service provider (CSP), such as Amazon, Google, and Microsoft, are improvise cloud computing services to be accessible for huge amount of customers. It is noted that privacy issues have been highlighted as a strong valiant in implementing cloud computing. There are various studies on cloud computing privacy section and on e-learning system solitude region that have been conducted. However, this paper has found significant gaps in the literature related to cloud based e-learning in terms of secrecy. So there is need to consider factors related to data privacy and issues related to cloud based e-learning. The concerns of cloud computing solitude and needs of e-learning system privacy has been addressed. ⁴²The challenges faced by cloud users and providers are security towards cloud services. The main factor which needs attention is security in cloud. There are reliance based solutions accessible to give security in various concerted environments. It depicts a new way of online learning based on cloud. ⁴³Availability of contents for students at every time and anywhere with less cost is the main objective of the most of the educational sectors. This is possible by online Cloud based learning. In, this security issues and architecture of cloud for online leaning is described. ⁴⁴ It provided various studies of cloud model for security issues and various proposed models for the problems related to online learning. Various factors like Threats, security requirements, and challenges were also considered.

D. Implemented in Countries

⁴⁵Nevertheless, in good education the use of cloud computing in Sub-Saharan countries is exceedingly down. Although various factors that may persuade educational institutions to adopt cloud services, cost effectiveness is often a key factor. Far excessively diminutive is known on how much the use of cloud computing can be cost effective in delivering eLearning services. It compared the cost of hosting eLearning services between cloud-hosted approaches and on-premise approaches in advanced edification; Tanzania was taken as a case swot up. The study found that by applying cloud based technology the cost factor decreased totally. ⁴⁶The reliable computing environments and highly scalable resources that can formulate them accessible to users are provided by cloud. The concept and architecture of cloud computing is focused in this paper. It

discussed the utilization of learning technologies circumstances in rising countries and also in Libya. The challenges faced in execution of cloud based e-learning in various education sectors in rising countries are also included in this. ⁴⁷In the Arab world through the advancements of ICT in education E-Learning techniques positioned it into the form of services within Services Oriented Architecture Technique (SOA), and the Education Business Intelligence (EBI) combine its input and enrich it to do work for educational virtual worlds. This paper showed the environment generated from self and simulated learning surroundings based on cloud which comprised of various tools and techniques. It focuses on designing and monitoring educational platform based on reclaiming the prevailing techniques, web gears and services to provide Browser-based-Application.

E. Implemented in Universities

⁴⁸In this paper, author study how cloud computing can promote e-learning education in KSA. The cloud computing educational surroundings and discover how universities and institutions may take advantage of clouds not only in terms of price but also in terms of effectiveness, consistency, portability, elasticity, and safety measures. It presents a number of case studies for informative clouds introduced by admired cloud providers which imitate the growing interest in this new movement. It also studied prospect challenges to cloud edification. ⁴⁹At present Nigeria has one solitary mode open University, the National Open University of Nigeria (NOUN) and six dual mode universities (Conventional Universities with distance Learning Centres recognized by National Universities Commission. Online learning based on cloud is suitable for delivering sound and flexible education in Nigeria because, deployment of the system can be done very fast with minimum cost; it also lessen the burden of maintenance and sustain from the university. ⁵⁰For the problems like scalability and storage limitation, cloud computing provided a best solution for the users. The motivation and characteristics of cloud these two factors are used for evaluation of research model based on cloud based online learning. In total, questionnaire is surveyed on 250 students from King Mongkut's Institute of Technology Ladkrabang. By factor and multiple regression data analysis is carried out. Availability, collaboration, online cloud-based learning notifications, intrinsic motivation and extrinsic motivation are the Overall factors that influence the intent to use cloud-based e-learning. However, these account for only 62.9% of the usage purpose, and so other factor(s) still linger to be resolute. ⁵¹The work of this paper includes combination of data, method, applications and requirements based on web application. Moodle and OpenDAP directory is used for user accounts, OpenNebula toolkit is applied for cloud. At the E-Business Lab, University of Belgrade execute this environment for undergraduate learners. ⁵²To present the usage

of cloud for online learning. It raises factor that how without resources various education sectors are facing problem but with the cloud computing they can overcome from this problem, further in future this cloud based services are also implemented in government schools, universities and colleges soon.

F.Implemented in Government sectors

⁵³The proposed cloud based CVE(Collaborative Virtual Environment) was able to advance the competence of the conventional CVE by allowing more access to ICT resources in a cost effectual way than the conformist CVE. Its proposal with trivial adjustment can be applied to edifying purposes, and distribution of government tasks to agencies.⁵⁴In this paper author advocate with the introduce of cloud in administration services how without having heavy infrastructure on user end it can run smoothly. With the execution of E-Cloud (E-Learning using cloud) it helps various government sectors to think about this technology to use in rural areas of India.

G.Based on Tools

⁵⁵To adapt ERP today is not possible for various educational institutions because there total institutional budget is very low. They proposed a model which follows web based and cloud based educational ERP in less cost. Various E-learning tools are not easily accessible to users and also not modifiable, so there is need of such tool which is easily which fulfil all institutions need with no maintenance cost. In it proposed a tool by which user can use data at any time with sharing and it is easily available for all. It follows Pay As You Go (PAYG) model because of which cost of various organization will totally vanished.⁵⁶Nowadays web 2.0 and cloud etc., is more successful in enlacing to give collaborative and interactive elearning environments. The actual challenge lives in interacting those technologies to construct correspondence learning remits. They are presenting the advantages of cloud based online education and integrating web 2.0 collaboration techniques. For science education it also gives an interactive tool.It describes the combination of cloud and web 2.0 for online education.

H.On Literature based

⁵⁷E-learning is a relatively new concept, even new concept is cloud computing. Thus, there is necessity to do research on how the two modernizations can together do work. It showed the challenge within the viewpoint of higher education and it contains contextual literature research on these imperative concepts before ascertaining where gaps exist.

I.⁵⁸ The technology which gives us the way to use the resources of computer anywhere and anytime is the cloud computing .⁵⁹Its use will definitely enhance e-learning which is a technique to deliver, support and enhance learning.

J.Implemented for Visually Handicapped Students

⁶⁰It includes about the features and the problems faced by cloud based e-learning for visually disabilities. It also proposed the cloud based resources whatever problems they are facing during execution of this for disables. In this author proposed the cloud based resources of e-learning to visual disables so that they can easily access that when they needed and the proposed architecture is not for all and itself intelligent which is easily available for them.

K.Based on Mobile cloud learning

⁶¹Mobile cloud learning, is a term which emerged from two terms i.e mobile learning and cloud computing, is a relatively new concept that holds a new advancements in future enlargement and delivery in the education sectors. The chief focus of this paper is to explore how cloud computing changes traditional mobile learning. The Usage of Moodle in the cloud via mobile learning in Khalifa University case study was conducted.

L.Based on combination of various aspects

⁶²It includes the features of current online learning and then cloud and its architecture is explored. By combing this features of online education are discussed. An e-learning cloud is made, and make an active research and by three aspects: architecture, construction method and external interface with the model they explored.

M.Based on various subjects

⁶³Cloud is the way of computing resources (hardware and software) that are delivered as a service over a network (typically the Internet). By the combination of online education and cloud the researcher proposed the environment for scientific subjects. Three core science subjects (physics, chemistry and biology) are used as test bed for this research work.PHP for server side scripting is used. For media content authoring Action script and Macromedia-Flash and as the back-end database MySQL is used.

N.Based on Adaptive Interface

⁶⁴Institutes can increase the participation of learners for taking online subjects with the assistance of cloud deployment model. In this paper, adaptive e-learning on based on learner's learning styles and the application on hybrid cloud is deployed to achieve various non-functional requirements. Service as Learning Styles and Adaptive Interface as a Service two innovative services are elaborated.⁶⁵The learning behaviour of Indigenous and non-Indigenous students are different. The concepts thought to Indigenous students by the teachers are frequently misunderstood the content and examples, and cultural constraint is an important factor in learning. This study developed a new learning system with information technology for Indigenous students. For indigenous culture

into a cloud-based Indigenous elementary school e-learning system is established. Students can read e- books online and study new vocabularies with teachers' explanations. Moreover, students after completing very segment of a whole lesson can do exercises. After finishing the course, students take an examination for evaluating the learning effects. In addition, author conducted a questionnaire to survey user satisfaction by online learning system, and the results show that most of the students (84.6%) were satisfied with the system.

III. Comparative table of survey and observations:

TABLE I

Sr No.	Paper Reference	Observations	Shortcomings
1	¹	Showed a little meanings of cloud computing and e-learning and it also elaborated about architectures, needs and benefits of cloud.	Cloud based design was not included.
2	²	Cloud computing, often referred to as simply the cloud, is the delivery of on-demand computing resources—everything from applications to data centres—over the Internet on a pay-for-use basis.	Architecture can be more improved in future in terms of cloud technology.
3	³	Cloud based electronic learnin provides many benefits. For education sector online learning is of high cost and they cannot afford. So best answer for this is cloud computing which involves features of e-learning.	Analysis of data for given country was not briefed
4	⁴	There is a major affect of cloud based online learning on educational environment. So this was widely used by all the institutes these days.	Benefits of cloud towards rural part of the world was not showed
5	⁵	As distance education, people are scattered at different places. So there was need of online education and for this cloud computing helped in online education. Cloud computing system combines the features of e-learning.	Metrics was not available for measurement of cloud services.
6	⁶	E-learning system a feasible cloud computing benefits and issues work mode skills.	Issues related to cloud was not completely taken.
7	⁷	Cloud based electronic learnin provides many benefits. For education sector online learning is of	Analysis of data for given country was not briefed

		high cost and they cannot afford. So best answer for this is cloud computing which involves features of e-learning.	
8	⁸	A comparative analysis of our proposed architecture with the existing one to demonstrate the advantages of the proffered architecture over the current one.	Cloud was made available only for education sector.
9	⁹	There is a major affect of cloud based online learning on educational environment. So this was widely used by all the institutes these days.	Benefits of cloud towards rural part of the world was not showed
10	¹⁰	As distance education, people are scattered at different places. So there was need of online education and for this cloud computing helped in online education. Cloud computing system combines the features of e-learning.	Metrics was not available for measurement of cloud services.
11	¹¹	This paper described attractive online learning based on cloud in detail.	Less number of Shared resources was picked.
12	¹²	Advantages and shortcomings of cloud based e-learning is included in this paper.	Few cloud service providers was included.
13	¹³	In this paper, an academic cloud framework is proposed in order to provide a new era in e-Learning.	On real cloud environment was not correlated.
14	¹⁴	E-learning provided many benefits such as flexibility, diversity, etc. For institutions e-learning was of high cost and they cannot afford. So best answer for this was cloud computing which involved features of e-learning.	For only Indonesia country research was designed.
15	¹⁵	Discussed the up gradation of the online learning portal from a traditional hosting platform to a cloud computing platform.	Contents links was available in the model direct contents were not.
16	¹⁶	In this paper, author introduced a new mode of e-learning, offered as a service, leveraged by cloud computing capabilities. The paper mainly presents SaaS based e-learning system architecture, which is a now widely adopted software delivery model satisfying need of multiple learners at a	Other services of cloud were not included only Saas was considered.

		time.	
17	¹⁷	Online education facilitate the teachers as well as students by efficiency filled approaches based upon cloud services technology.	Cloud benefits were not completely included.
18	¹⁸	Problem based learning emphasis on self-opting skills, encouraging soft skills by providing a problem solving manual.	For engineering and for specific group cloud was considered.
19	¹⁹	Cloud computing enserves of an excellent alternative of different app's offered by service providers.	Security and data protection risk was not included. All applications were not compatible with cloud.
20	²⁰	In this editorial service oriented cloud computing architecture is used to transmit E-learning into the cloud.	Only Service oriented architecture was proposed, other services were not included.
21	²¹	The learning of integrated system abolish new resources and fields of concept based learning.	Contents were not completely available in proposed e-learning cloud.
22	²²	A comparative analysis of our proposed architecture with the existing one to demonstrate the advantages of the proffered architecture over the current one.	Cloud was made available only for education sector.
23	²³	This paper proposed architecture, comprises of three major parts and they are Workload Analyser, Priority Scheduler and Accountability Monitor.	Framework was not implemented on cloud environment.
24	²⁴	This paper introduced an innovative model for harnessing cloud computing infrastructure within an e-learning ecosystem.	E-business lab was used for work. Other resource centres are not suggested.
25	²⁵	In this Time Based Load balancer algorithm was developed to distribute the load equally among the host machine.	Designed for private cloud.
26	²⁶	A novel model is proposed for semantic based content storing of E-Learning materials on the cloud.	Comparison approach was so complicated.

27	²⁷	E-learning helped users to access various software applications and they can share data. There was large demand of cloud infrastructure and this leads to power consumption which was not environment friendly. But by using e-learning application COGOLA, it will lower the cost and power consumption.	Technical factors were not elaborated related to carbon emission.
28	²⁸	Cloud computing promises various benefits and shift promises from one organization to another.	Cloud was considered at only institutional level.
29	²⁹	This research study aimed to commence a novel platform to spawn interactive e-books. In order to create digitalized forms of exercise books for primary school children, additional features have to be added to gain acceptance by such an idea. The evolution of new e-book standards as EPUB in its version 3.0 makes it possible to generate those additional features.	Cloud based services are only for e-books are available.
30	³⁰	This paper presents the positive impact of using cloud computing architectures upon E-learning solutions development.	E-learning project management challenges were only considered other challenges were not taken.
31	³¹	In this paper, an academic cloud framework is proposed in order to provide a new era in e-Learning.	On real cloud environment was not correlated.
32	³²	It includes the features of e-learning and then correlate with cloud , it also includes about its architecture.	Architecture and security parameters were not so much defined.
33	³³	E-learning provided many benefits such as flexibility, diversity, etc. For institutions e-learning was of high cost and they cannot afford. So best answer for this was cloud computing which involved features of e-learning.	For only Indonesia country research was designed.
34	³⁴	It proposed cloud based ICT architecture for Indonesia Open Educational Resources (IOER)	Analysis regarding Indonesia region was done.

35	³⁵	This paper represented the "Education and Learning as a Service" (ELaaS) by combining cloud with this is become very useful for education sector .	Based on cloud Solutions for electronic was not provided completely.
36	³⁶	It contains all needs like: electronic learning systems, requirements in general, pedagogical requirements, technical requirements including non-functional requirements, to fulfilled all these it proposed online learning cloud based belongings.	All Functional needs were not collected completely.
37	³⁷	The advantages of using cloud with the integration of Web 2.0 collaboration technologies in eLearning environment.	Integration of cloud and Web 3.0 was not analysed.
38	³⁸	A special PLEPOX is analyzed and a set of innovation is proposed.	In this from student point of view was not focused completely.
39	³⁹	The proposed model is adaptive and exceedingly portable that can be effortlessly customized to any existing cloud platform.	Cloud computing was introduced only for mobile devices other wireless devices were not elaborated.
40	⁴⁰	The online learning based on cloud provides a new solution to establish a unified flexible network teaching platform and hardware input.	Study regarding the attitude and strategy for migration to the proposed architecture based on clouds was not painstaking
41	⁴¹	Facts of cloud computing solitude and needs of e-learning system privacy will be addressed.	Data security methods related to cloud were not included.
42	⁴²	This paper described attractive online learning based on cloud in detail.	Less number of Shared resources was picked.
43	⁴³	E-learning was very difficult to deliver the material to students and requires more hardware for serves. So cloud computing learning	At System level it was implemented, for wireless devices it was

		was effective and provides security issues also.	not analysed.
44	⁴⁴	Online Cloud based learning has massive advantages but it compromise in safety aspects. But design methodology ensures the data safety. Users can access their data in the cloud through a secured layer using the internet.	Security management methods were not discussed.
45	⁴⁵	This paper compared the cost of hosting eLearning services between on-premise and cloud-hosted approaches in higher education, taking Tanzania as a case study.	Private cloud was not included and cost of cloud was taken on monthly basis.
46	⁴⁶	This paper focused on the concept and architecture of cloud computing. It highlights the state of the art on the utilization of learning technologies in Libya as well as in other developing countries.	Challenges of cloud based learning was not mentioned.
47	⁴⁷	This paper presented a creative environment derived from both virtual and personal learning belongings based on cloud which contains variety of tools and techniques to enhance the educational process.	Analysis was cannot be used by any other country than Arabic country. Interface language were not universal.
48	⁴⁸	Author presented several case studies for instructive clouds introduced by popular cloud providers which reflect the growing interest in this new trend. They also argue future challenges to cloud edification.	Case studies was not completely included.
49	⁴⁹	Online cloud based learning was suitable for delivery sound and flexible learning in Nigeria as exploitation of system can be done very fast with vast expenses.	Research was based on problem faced by Nigerian country education system.
50	⁵⁰	Cloud base online learning system matches well with the learner's requirements and solves the existing problem.	Data was analyzed on 250 students only.
51	⁵¹	The work of this paper includes combination of data, method, applications and requirements based on web application	For VM directory directly execution Moodle is not provided. Through Moodle and

			ELABCloud applications students analyses reports were not provided.
52	⁵²	This paper presents the usage of cloud for online learning. It raises factor that how without resources various education sectors are facing problems.	How government can take initiative for cloud advancement was not elaborated.
53	⁵³	Collaborative Virtual Environment (CVE) provides opportunity for users in a distant location to share and access Information and Communication Technology resources.	Conventional e-learning were not compared with online cloud based learning.
54	⁵⁴	E-Cloud (E-Learning using cloud) concept of this paper will help to make a huge difference, how governments may deliver e-Learning services in towns and villages of India.	Cloud management unit was not explored.
55	⁵⁵	By Proposed tool in this paper user can use data at any time with sharing and it is easily available for all. It follows Pay As You Go (PAYG) model because of which cost of various organization will totally vanished.	Compared with ERP educational tools, with other tools were not compared.
56	⁵⁶	They are presenting the advantages of cloud based online education and integrating web 2.0 collaboration techniques. For science education it also gives an interactive tool. It also describes the combination of cloud and web 2.0 for online education.	Architecture design view was not available.
57	⁵⁷	This paper contains contextual literature research on these imperative concepts before ascertaining where gaps exist and the challenge within the viewpoint of higher education.	For higher education only cloud concept was elaborated.
58	⁶⁰	This paper presents the usage of cloud for online learning. It raises factor that how without resources various education sectors are facing problems.	How government can take initiative for cloud advancement was not elaborated.
59	⁶¹	In this editorial service oriented cloud computing	Only Service oriented

		architecture is used to transmit E-learning into the cloud.	architecture was proposed, other services were not included.
60	⁶²	The proposed model is adaptive and exceedingly portable that can be effortlessly customized to any existing cloud platform.	Cloud computing was introduced only for mobile devices other wireless devices were not elaborated.
61	⁶³	Cloud computing was a use of computer resources while e-learning was fashionable term used to explain data. Cloud based online learning showed the design and implementation for scientific subjects.	No. of subjects was taken only three.
62	⁶⁴	The emerging technologies that were to be concentrated for developing usage of e-learning application was cloud computing and web 2.0. It was an interactive tool that can be used for science education.	Non functional requirements were not completely taken.
63	⁶⁵	The learning behaviour of Indigenous and non-Indigenous students are different. The concepts thought to Indigenous students by the teachers are frequently misunderstand the content and examples, and cultural constraint is an important factor in learning. This study developed a new learning system with information technology for Indigenous students	For analysis 4 schools was chosen.

IV. Conclusion and Future Work:

The survey clearly shows that cloud computing has been used for e-learning but still a more efforts are needed to implement cloud based online learning and more issues should be elaborated. Those who want to explore their research in this field this paper provides a guideline to them.

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