



# SCOPE OF CLOUD COMPUTING IN HIGHER EDUCATION

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## ABSTRACT:

Cloud computing is a hastily evolving era that has generated huge adjustments and possibilities in diverse sectors in India. It is a ubiquitous computing paradigm that has revolutionized IT infrastructure and carrier shipping. Interest with inside the use of cloud computing with inside the schooling region is growing. The gift examine is a try to provide a top level view of the cloud computing version and its programs for collaboration among technology and college students. In these paintings we've got proposed cloud computing for e-studying below the subsequent aspects: mode of paintings, offerings, blessings and problems. This article is an analytical examines of the position of cloud computing in schooling on the subject of control institutions. The number one examine become performed with the principle actors of the instructional technical infrastructures applied for instructional use. The nation of the art work for the use and studies of cloud computing in schooling become decided the usage of a qualitative methodology. After a complete evaluation of to be had literature, about eight studies articles had been recognized and mentioned to spotlight the significance and probable makes use of the cloud in schooling. The survey identifies and analyzes the blessings and dangers that the usage of cloud computing will have for key stakeholders in schooling. Comprehensive evaluation indicates that the creation of cloud computing in control schooling is possible to offer greater read ability on its blessings.

Keywords: Cloud Computing, Cloud Computing and Learning as a Service (LaaS), Software as a Service (SaaS), Virtual Computing Laboratory (VCL), Distributed Learning Environments, Interactive Learning Environments.

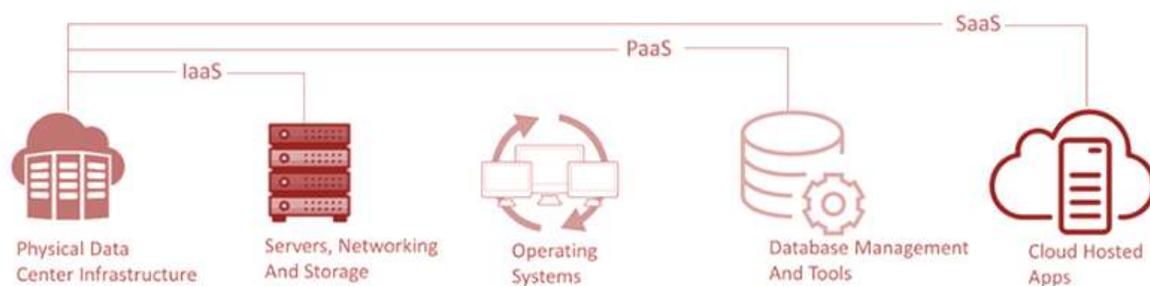
## INTRODUCTION

In the latest years, e-studying equipment appears to develop and was extensively established as a studying method (Ewuzie & Usoro, 2012). In latest years, "cloud computing" has been an increasing number of debated in exceptional forums (Krelja Kurelovic, E., Rako, S. and Tomljanovic, J., 2013). Cloud

computing isn't always a very new concept, however a mixture of latest and present technologies. Cloud computing is likewise an evolving and disruptive era that gives computing power, massive storage capacity, programs and offerings to the person over the Internet. This new computing fashion is centered on person needs and is likewise pushed with the aid of using the growing use of diverse cellular gadgets inclusive of laptops, tablets, and smart phones. Cloud computing has many blessings with a few barriers derived from the truth that each one records and Applications may be discovered at the Internet. Since records and programs saved with inside the cloud may be accessed in actual time and online, it is able to be utilized in diverse sports of each day life, which include schooling. Cloud computing is a version for permitting handy on-call for community get entry to shared pool of sources (eg, servers, storage, programs, and offerings) that may be dynamically provisioned and shared with minimum administration. Cloud-optimized utilization and utilization is the inspiration of creditable commercial enterprise value. For formal and casual schooling, many programs and cloud offerings get entry to may be supplied to college students and teachers. Cloud computing allows more flexibility and mobility with inside the use of sources for coaching and studying with better ranges of collaboration, communication, and useful resource sharing. It additionally creates customized studying surroundings or digital coaching and studying communities.

### CLOUD SERVICE MODEL REVIEW

Cloud computing has crucial shipping fashions, inclusive of private, public, and hybrid, however it has different traits inclusive of client-server, grid, fog, and peer-to-peer computing. All cloud shipping fashions provide exceptional offerings inclusive of Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS) (Alshuwaier & Areshe, 2012).



**Figure 1: Three Services Model of Cloud Computing**

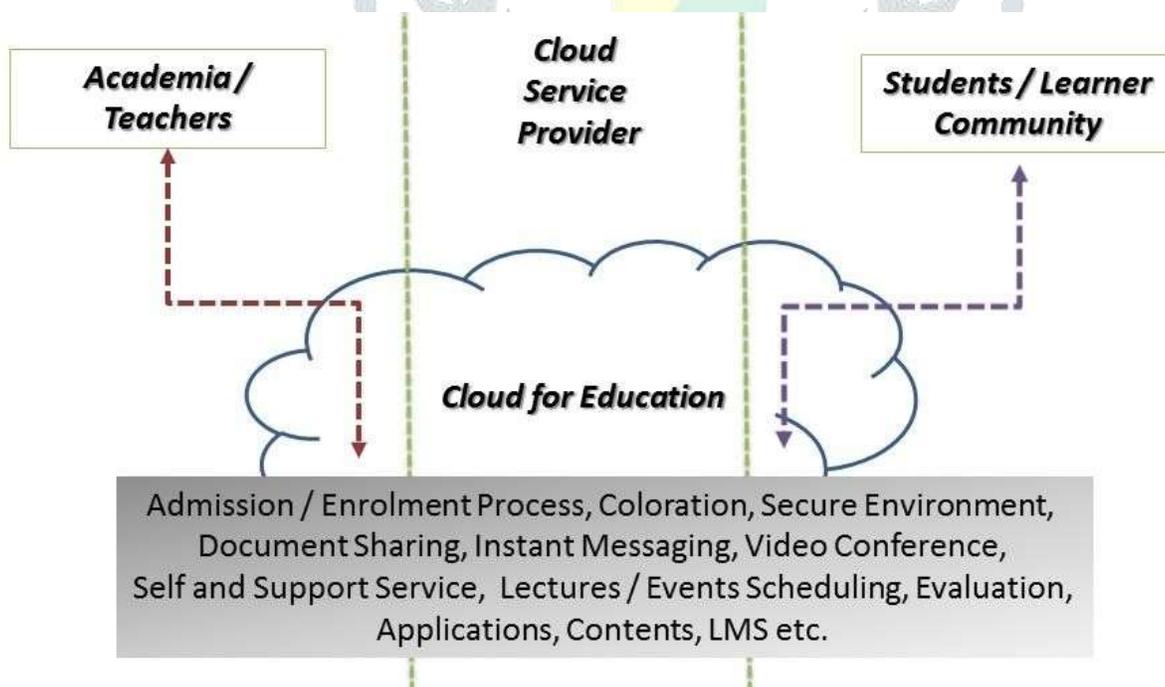
Infrastructure as a carrier (IaaS): With this cloud carrier version, the carrier issuer hosts the vital hardware and the Internet connection. The person is most effective liable for the digital system hosted in this hardware and for the software program (which include the working system) that runs on it. As proven in Figure 1, that is the last / lowest layer and software program run on it. This carrier presents an on-call for infrastructure inclusive of storage, computing, networking, control and aid additives (digital servers). This infrastructure is accessed thru the Internet in order that groups can flow their records to the cloud. This effect with inside the dissolution or decommissioning of inner records centers. Each of those offerings may

be supplied with the aid of using companies or people as a private, public, hybrid or network cloud. Platform as a carrier (PaaS): With this cloud carrier version, the person presents the utility they need to offer and the cloud carrier issue presents all of the additives which are required for the operation of this utility, which additionally referred to as utility hosting. As proven in Figure 1, that is the center tier among SaaS and IaaS. It presents working structures and a utility improvement platform that may be accessed and used over the Internet. Developers use this platform to develop, test, deploy, and host net programs as a carrier over the Internet. E.g. vendors of such structures as a provider are Google Application Engine, Microsoft Windows Azure and International Business Machine (IBM).

Software as a Service (SaaS): In this cloud provider version the provider issuer components the software program software and all of the additives required for its execution. SaaS is designed to be a turnkey answer for the clients. Many web-ERP software program answers are hosted at the SaaS cloud and offer accounting and commercial enterprise Information to the consumer or client. As proven with inside the parent 1, that is the top-maximum layer of cloud computing. This layer entails programs consisting of textual content processors, video editors and databases to be hosted via way of means of cloud provider issuer and is made simply to be had to the customers on call for through Internet. Few examples of software program as a provider consists of client relation control (CRM), e-mail messaging, Google Document (Doc) etc. (Alshuwaier, Alshwaier, & Areshey, 2012)

### COMMUNITY CLOUD:

It is completely for a hard and fast of customers inside closed institution having a not unusual place goal.



**Figure 2: Cloud for training**

Many Universities / Institutes provide whole on line training packages the usage of hybrid cloud version. These Universities / Institutes put in force cloud-primarily based totally answers for his or her IT infrastructure. The principal use of cloud-sourcing is for E-mail, calendaring, collaboration, video conferencing, ERP (business enterprise aid planning) and gaining knowledge of control systems. Outsourcing the availability of gaining knowledge of control answers (LMSs) consisting of Blackboard or Module to a 3<sup>rd</sup> celebration makes experience for establishments to who can't justify the fees of purchasing, keeping and helping the hardware and software program themselves. Such LMSs answer offers collaboration among academia and college students. The e-gaining knowledge of cannot absolutely supplant educators; it's miles only are modeling for innovation, thoughts and instruments, giving new substance, thoughts and strategies for guidance, so the elements of teachers cannot be supplanted (Ishaq & Brohi, 2015).

### ROLE OF CLOUD IN EDUCATION

The administrator, a teacher, a scholar, or the parents, now have a brilliant time to discover how cloud-primarily based totally programs can advantage Students and Institute or University (Kaur & Singh, 2015).

BENEFITS	DESCRIPTION
Less high-priced or subscription primarily based totally textbooks	Submit graduate degree textbooks are high-priced and feature much less quantity of copies in library. Cloud-primarily based totally textbooks can resolve this trouble via way of means of changing them in to virtual content material format, which might be much less high-priced than published. This will assist the lower-earnings institution college students to have get entry to first-class gaining knowledge of substances.
No extra old gaining knowledge of substances	Many times, the high-priced published textbooks which college students are the usage of from library are old. Also because of economic issues or price range provisions, alternative of those old assets turns into an issue. In Cloud- primarily based totally substances are smooth to replace on actual time

	<p>basis, so that scholars get entry to the present day gaining knowledge of assets.</p>
Less hardware costs	<p>Cloud-primarily based totally programs runs on Internet browsers and they're additionally well suited with the cellgadgets. This manner that learner does now no longer always want to personal a high-priced computers / laptop, a Smartphone or Tablet can get entry to those programs. Learner does not want to shop for any garage gadgets, because the information may be saved directly to cloud like Google Drive.</p>
No high-priced software program required	<p>One of the most important benefits of cloud computing is the SaaS version (software program-as-a-provider). Many software program applications based on Android primarily based totally gadgets are now to be had both loose and on a low-price subscription basis.</p>
Students attain	<p>Cloud computing has opened an international of recent opportunities for learner and academia. Now the learner can earn their degree through opting on line guidance medium. There are many different varieties of college students for whom a conventional college surroundings absolutely does not work, and cloud computing has furnished change to those college students.</p>
Environment	<p>Clouds computing now no longer most effective lessen fees, however additionally create a surroundings where in all learner have get entry to high- first-class training assets. Such on line cloud primarily based totally surroundings create collaboration among academia and scholar or learner.</p>

But for the reason that Internet is a public media or community with little regulation, it additionally ends in a few issues. But as an increasing number of records are being located at the cloud, issues are starting to develop approximately simply how secure surroundings its miles? (Viswanath, MD, Kusuma& Gupta, 2012)

Issue	Description
Security	The client argument that the information is extra steady whilst controlled internally on neighborhood hard-disk or LAN garage. Also the region of information garage is unknown with inside the cloud surroundings.
Privacy	Unlike conventional computing version, the cloud computing makes use of the digital computing technology where in consumer information can be scattered at numerous digital information facilities, which is probably positioned geographically at special region. Where there could be controversy in information privateness safety with inside the locational criminal systems.
Reliability	In cloud computing servers also experience downtimes and slowdowns and customers have a better or whole based on cloud provider issuer (CSP)
CSP Locked-in	In the CSP's provider version, as soon as the choice of a particular CSP is done, the information is uploaded directly to CSPs Infrastructure. Which brings locked-in, accordingly carry a capacity commercial enterprise risk
Attacks, Hacking, Theft	Hackers can invade really in to any server and the information display that one-1/3 of

	breaches end result from stolen or misplaced gadgets. The different cause is from employees' accidentally exposing information at the Internet. Attackers have cap potential to research the essential venture submitted via way of means of the customers at the cloud.
Open Standard and APIs	The open requirements are essential to the boom of cloud computing. Most cloud provider vendors reveal APIs which are specific to their implementations and aren't interoperable.
Compliance	The rules to the storage and use of the information require ordinary reporting and audit trails, cloud provider vendors should permit their clients to comply with those rules. In addition the information facilities maintained by the cloud provider vendors are additionally be the challenge to compliance requirements.
Long-time period Viability	User ought to expand a few mechanisms to make sure that the information they positioned in to the cloud will be no means grow to be invalid even if cloud provider shuts or get acquired by other company.

## SOLUTION

As the development in cloud computing, the person community must take proactive measures to make sure protection with the aid of using the statistics encryption. Also want to test CSP vendor's readiness for security certifications and outside audits, identity management, get entry to manage, reporting of security incidents, personnel. The person network want to ship and keep decrease non-public statistics with inside the cloud. Cloud Service Provider has to permit and maximizes the person manage and provide feedback.

## DATA ANALYSIS AND INTERPRATATION

The statistics accrued for these studies have been from each number one and secondary sources. The number one supply statistics have been accrued the use of questionnaires, even as the secondary supply

statistics have been amassed from instructional Journals, courses, the Internet and literature primarily based totally on cloud computing (Awosan, 2014).

### Questionnaires:

The questionnaires have been allotted the use of Google docs, anonline survey utility due to the fact this allowed for easyadministration of questionnaire. It lets in for less complicated statistical evaluation. (Gupta, N., & Thakur, S., 2014). The questionnaire hyperlink turned into emailed to respondents and turned into introduce to the concern in a non-public assembly with them.

### Secondary Data:

The secondary statistics used for this studies turned into received from instructional journals, Google student search engines like google and yahoo etc. Also, many beneficial courses from net have been used. The statistics from those sources have been beneficial in growing the literature review, the studies targets and studies plan.

The statistics evaluation turned in to execute at the responses given with the aid of using fifty three respondents from Graduate Degree Colleges, Post Graduate Institutes and University Study Centers.

**Table1: Type of organization**

Experience	Degree College	Post-Graduate Institutes	University (Distance Mode)
Organization type offers higher education	31(54.8%)	18(35.8%)	7(9.4%)

**Table2: Media of study material distribution to students**

Media	Count	%
Text Books, Printed Notes	21	51.9%
eBooks	28	53.8%
CDs	12	23.1%
Depends on Teacher / Faculty	48	92.3%
None	5	9.6%

**Table3: Mode for course / subject lecture delivery**

Course Delivery Mode	Count	%
Personal Contact Programs(Periodic in year)	8	11.4%
Virtual Class Rooms / Video Conference	16	31.1%
Course based Video Lectures	9	11.2%
Traditional Class Room Teaching	47	90.5%
None	2	3.8%

**Table 4: Awareness of Internet /cloud computing**

Experience	Not aware	Somewhat aware	Totally aware
Awareness of Internet/ Cloud Computing	6(11.09%)	41(75.58%)	8(13.32%)

**Table 5: Website for content delivery**

Website Hosting Mode	Count	%
In-House	2	2.9%
Out-Sourced	11	20.6%
Web-sites(No knowledge about hosting location)	26	47.3%
No	18	32.2%

**Table 6: What Cloud/ Internet based services your Institute has adopted?**

Internet / Cloud based services	Count	%
CRM,ERP, any Web Application	9	17.0%
Web based email like Gmail, hotmail etc.	51	96.2%
Google Docs/Groups(Students Collaboration)	29	54.7%
Video Dictionary of Lectures	6	11.3%
Storage for Data Sharing	24	45.3%
Online Library for eBooks, article, white papers	12	22.6%

**Table 7: Will cloud computing play major role in the collaboration at your Institute?**

Role of Cloud Computing	Count	%
Yes	21	39.6%
No	3	5.7%
Never thought about it	23	43.4%
Neutral	6	11.3%

**Table 8: Do you find cloud computing is insecure medium / environment (Trust Factor)**

Cloud Computing in secure Medium / Environment	Count	%
Strongly Agree	0	0%
Somewhat Agree	32	60.4%
Disagree	1	1.9%
Neutral	20	37.7%

**Table 9: Factor might affect the adoption of cloud computing**

Factor affect the adoption of Cloud Computing	Count	%
Internet Bandwidth	19	35.8%
Staff Motivation	24	45.3%
Budgets, College / Institute Policy	21	39.6%
Vendor Support	11	20.8%
Neutral	23	43.4%

**Table10: factor affects the adoption of cloud computing in education**

Factor affect the adoption of Cloud Computing in Education	Count	%
Security, Privacy, Reliability issue	23	43.4%
Hacking, Theft, Attacks	14	26.4%

Content Development	23	43.4%
Laws and Regulation	0	0%
Neutral	25	47.2%

### LIMITATION:

Although the studies have reached its aims, however there are a few limitations. These studies become carried out on a small length of populace in Mumbai- Thane region. We have amassed statics approximately the challenge from the University, Institutes and Degree College's who gives control schooling. For the facts amassing the qualitative questionnaire had beenstuffedvia way of means of the officers from the reputable institute's gives control schooling.

### CONCLUSION

The cloud computing is an unexpectedly growing Internet primarily based totally computing model. With the aggregate of e-mastering the usage of cloud computing and control schooling, opens up new thoughts for similarly development. This paper we've mentioned a cloud computing primarily based totally eLearning, advantages & issues. There isn't any doubt that the creation of cloud computing into control schooling is feasible & brings us the about endless computing capability, scalability, advantages to the college students. The paper additionally highlights the use of cloud isn't always good enough with inside the diploma degree colleges, which desires to be improved. 53% of the establishments offer eBooks that is a bonus for college students and converting environment. The 92% of the establishments makes use of conventional elegance room coaching approach and extensively utilized video convention for lecture delivery. 73% of the institute officers are absolutely aware about Internet and cloud computing technologies. 70% of the responding institutes have university website, however do now no longer have any mechanism for look at fabric or content material delivery. 100% of the responding institutes use e mail for collaboration with regulators, college students and different stake holders. 40% of the responding institutes agree with that cloud computing will play principal position with inside the corporation for collaboration. From protection issue 60% of the responding institutes agree with that cloud is truly insecure. 45% of the responding institutes agree with that personnel motivation will have an effect on their cloud adoption for control schooling. Majority of the responding institutes agree with that protection, privacy, reliability, hacking,

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