

# The Scope of Cloud Computing in Management Education

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**Abstract:** *Cloud computing is a rapidly emerging technology that has significantly changed and opened up potential for many Indian sectors. It is a ubiquitous computing paradigm that has completely changed the way that services and infrastructure for information technology can be provided. There is one increasing curiosity on cloud computing's application in the educational field. The goal of the current study is to give a general overview of the cloud computing concept and its uses for student and academic collaboration. In this article, we suggested cloud computing for e-learning based on its advantages, disadvantages, services, and manner of operation. This essay examines cloud computing's potential educational applications with a focus on management schools. A primary study was conducted with significant technical education infrastructure stakeholders, including*

*The most recent research on cloud computing's application in education was carried out using a qualitative approach. Following a thorough review of the literature, about eight research projects have been identified and discussed to emphasize the significance and likely cloud computing in the field of education. The primary stakeholders in education are identified and the benefits and hazards associated with using cloud computing are analyzed in this survey. The thorough research indicates that it is possible to offer more clarity about the benefits of cloud computing to management education.*

**Keywords:** Cloud Computing, Cloud Computing & Learning as a Service (LaaS), Software as a Service (SaaS), Virtual Computing Lab (VCL), Distributed learning environments, Interactive learning environments

## I. INTRODUCTION

E-learning resources seem to be expanding and gaining traction as a teaching tool in recent years (Ewuzie & Usoro, 2012). Over the past few years, "cloud computing" has shown up more and more in the various forums (Krelja Tomljanovic, J., Rako, S., and Kurelovic, E. (2013). Cloud computing is a hybrid of new and old technologies rather than a wholly original idea. Another innovative and cutting-edge technology that provides users with access to powerful computers, ample storage, apps, and services through the Internet is cloud computing. This new computing trend is centered on the needs of the user and is fueled by the rising popularity of mobile devices like smartphones, tablets, and laptops. Since all programmers and data are stored online, cloud computing offers a number of benefits along with several drawbacks. Because cloud-based apps and data are accessible online and in real time. It is applicable to a variety of daily tasks, particularly those related to schooling. A concept known as "cloud computing" allows for easy, on-demand network access to a shared pool of resources (such as servers, storage, apps, and services), which can be quickly supplied and released with little maintenance required. According to the adopted cloud model, the foundation for monetizable commercial value is its utilization. Students and teachers can access a variety of cloud-based tools and services for both formal and informal education.

## II. REVIEW OF CLOUD SERVICE MODELS

Major cloud computing deployment methods include Private, Public, and Hybrid. Other features include Grid Computing, Fog Computing, Client-Server Model, and Peer-to-Peer Computing. Every cloud deployment Various

services, including Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS), are provided by these models.

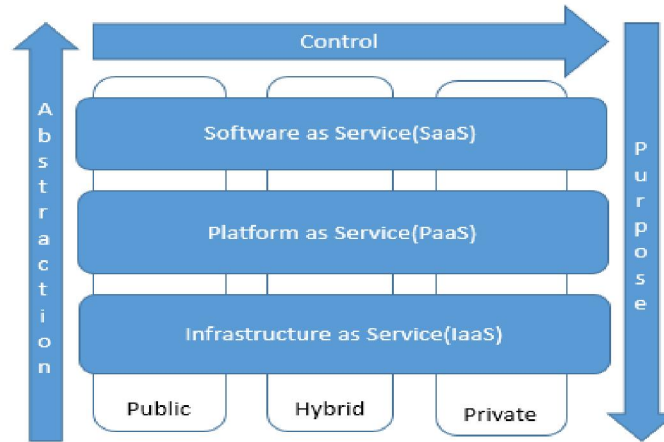


Fig.1 Cloud Service Models

**Infrastructure as a Service (IaaS):** The service provider hosts the essential hardware and the Internet connection link in this cloud service architecture. The virtual computer running on this hardware is solely the user's responsibility, and the software that runs on it, such as the operating system. This is the lowest layer, as depicted in figure 1, and it is where the software applications operate. Infrastructure, including networking, storage, processing, management, and support components (virtual servers), is made available on demand by this service. By using the Internet to access this infrastructure, businesses can shift their data to the cloud, leading to the dissolution or decommissioning of the internal data centers. Organizations and individuals can deploy each of these services as a private, public, hybrid, or community cloud.

**Platform as a Service (PaaS):** This cloud service model allows the user to supply the application they want to utilize, and the cloud service provider provides all the necessary hardware for the application to execute, arranging. This is the intermediate layer between SaaS and IaaS, as seen in figure 1. It offers web-based operating systems and an application development platform for users to access and use. This platform is used by developers to create, test, launch, and host web applications that are provided as online services. For instance, Google Application Engine, Microsoft Windows Azure, and International Business Machine (IBM) are providers of these platforms as a service.

**Software as a Service (SaaS):** The service provider provides the software programme along with all the parts needed to run it in this cloud service paradigm. SaaS is intended to provide clients with a turnkey solution. Numerous online ERP programmes Solutions that give users or customers access to accounting and business information are housed on the SaaS cloud. This is the highest tier of cloud computing, as seen in figure 1. This layer includes programmes that are easily accessible to users over the Internet, such as text editors, video editors, and databases, and are hosted by cloud service providers. A few instances of software as a service are email correspondence, Google Documents (Doc), customer relationship management (CRM), and so forth. (Areshey, Alshwaier, and Alshuwaier, 2012)

**Community cloud:** It is exclusively for a set of users within closed group having a common goal.

Using a hybrid cloud paradigm, numerous universities and institutes provide comprehensive online education programmes. These colleges and universities use cloud-based IT infrastructure technologies. Cloud sourcing is primarily used for calendaring, email, and ERP (enterprise resource planning), learning management systems, videoconferencing, and cooperation. If an institution cannot afford to purchase, operate, and support the hardware and software themselves, it makes sense to outsource the provision of learning management systems (LMSs) like Blackboard or Moodle to a third party. Collaboration between academic institutions and students is facilitated by these LMSs. According to Ishaq and Brohi (2015), e-learning is merely a venue for innovation, ideas, and instruments that provide fresh content, ideas, and methodologies for instruction; technology cannot completely replace educators.

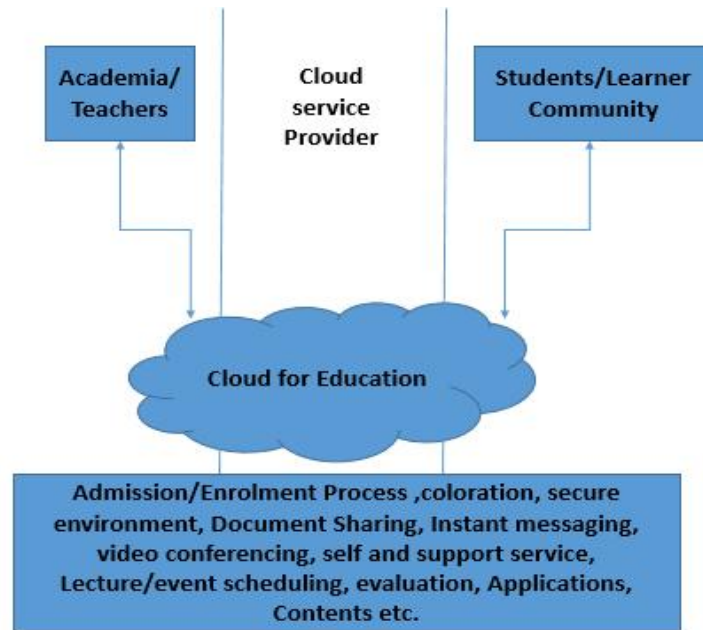


Fig.2 Cloud for Education

### III. ROLE OF CLOUD IN EDUCATION

Now is a fantastic opportunity for administrators, teachers, students, and parents to learn more about how cloud-based applications might help students and the university or institute.

Benefits	Description
<b>Less expensive or subscription based textbooks</b>	Textbooks for postgraduate study are more costly and scarce in library resources. This issue can be resolved by using cloud-based textbooks, which transform them in to less expensive digital content formats than printed ones. This will facilitate the access of pupils from lower-income groups to high-quality educational resources.
<b>No more outdated learning materials</b>	The pricey printed textbooks that students check out of the library are frequently out of date. Additionally, because of budgetary constraints or financial worries, replacement of There is a problem with these out-of-date materials. Cloud-based resources are easily updated in real time, giving students access to the most recent educational materials.
<b>Less hardware expenses</b>	Browsers on the Internet can use cloud-based apps, and mobile devices can also use them. This implies that the student is not required to have an These apps may be accessed on pricey laptops and PCs, smartphones, and tablets. Since the data may be saved on cloud services like Google Drive, the learner does not need to purchase any storage equipment.
<b>No expensive software required</b>	The software-as-a-service (SaaS) concept is one of cloud computing's greatest benefits. Numerous software programmes designed for Android-based devices are currently accessible for free or with a nominal subscription fee.
<b>Students reach</b>	Academics and learners now have access to a plethora of new opportunities thanks to cloud computing. The student can now choose to receive their diploma through online education. medium. There

	are numerous additional student types for whom a regular classroom setting is just ineffective, and cloud computing has given these pupils an alternative.
<b>Environment</b>	In addition to cutting expenses, cloud computing fosters an atmosphere in which all students have access to excellent educational resources. This kind of cloud-based online platform fosters academic collaboration. and learner or pupil.

However, the fact that the Internet is a network or public media with minimal control also causes some problems. However, worries about how safe of a place the cloud is are starting to arise as more and more data is stored there.

Issue	Description
<b>Security</b>	The client's claim that internal management of data on a local hard drive or LAN storage is more secure. In a cloud setting, the location of data storage is also unpredictable.
<b>Privacy</b>	Cloud computing, in contrast to the traditional computing model, makes use of virtual computing technologies, which allows user data to be dispersed among multiple virtual data centres, which might be situated in a separate geographic place. Where the locational legal systems' protection of data privacy may give rise to disputes
<b>Reliability</b>	In cloud computing, customers are more or entirely dependent on the cloud service provider (CSP), and servers also encounter slowdowns and outages.
<b>CSP Locked-in</b>	According to the CSP service model, data is uploaded onto the CSP's infrastructure when a specific CSP has been chosen. It creates locked-in and hence a possible risk to the firm.
<b>Attacks, Hacking, Theft</b>	Virtually any server can be compromised by hackers, and data indicates that lost or stolen equipment account for one-third of security breaches. The other explanation is due to staff members' inadvertent data exposure via online means. Attackers are able to examine the important tasks that users send to the cloud.
<b>Open Standard and APIs</b>	Open standards are essential to cloud computing's expansion. The majority of cloud service providers make their individual, non-interoperable APIs available.
<b>Compliance</b>	Regulations regarding the use and storage of data need frequent reporting and audit trails; cloud service providers are required to make it possible for their clients to adhere to these requirements. Furthermore, the Compliance rules also apply to cloud service providers' maintained data centres.
<b>Long-term Viability</b>	It is advisable for users to devise a safeguarding method to guarantee that the data they enter into the cloud remains legitimate, even in the event of cloud provider closure or acquisition by another entity.

#### IV. SOLUTION

With the development of cloud computing, users need to be proactive in ensuring data encryption and security. It is also necessary to verify the CSP vendor's preparedness for identity management, security certifications, and external audits. people, reporting security incidents, and access control. Users must transfer and save as little personal data as possible on the cloud. The cloud service provider ought to facilitate user control, optimise it, and offer feedback.

### **V. DATA ANALYSIS AND INTERPRATATION**

This study used both primary and secondary sources to gather its data. While the secondary source data were obtained from academic journals, publications, the Internet, and other sources, the main source data were gathered through **questionnaires**. books pertaining to cloud computing (Awosan, 2014). Surveys: Google Docs, an online survey tool, was used to distribute the surveys as it made questionnaire administration simple. It makes statistical analysis simpler. N. Gupta and S. Thakur (2014). Respondents were emailed a link to the questionnaire, and they were personally briefed on the topic.

**Secondary Data:** Academic journals and Google Scholar search engines, among other sources, provided the secondary data for this study. Additionally, a tonne of helpful online literature were consulted. These resources' data proved helpful in creating the review of the literature, the goals and plan of the study. 53 respondents from graduate degree colleges, postgraduate institutes, and university study centres provided responses for the data analysis.

### **VI. LIMITATION**

There are certain restrictions even though the research has achieved its goals. The Mumbai-Thane region's limited population was the subject of this study. We have compiled data on the topic from universities, colleges, and institutes that provide management education. Regarding the data Management education is offered by reputable institutions, whose administrators filled out the qualitative questionnaire.

### **VII. CONCLUSION**

A quickly evolving Internet-based computing paradigm is cloud computing. Combining management education with cloud-based e-learning creates new avenues for innovation and growth. In this essay, we've talked about clouds. computer-based e-learning: advantages and problems. Without a question, integrating cloud computing into management education is practical and advantageous for students, offering nearly limitless processing power and scalability. The report also emphasises the need for improvement in degree-granting universities' use of the cloud.eBooks are available at 53% of the universities, which is beneficial for students and the evolving environment. Ninety-two percent of the colleges employ video conferences in addition to the conventional classroom style of instruction. 73% of the organisation.

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