

## E- Learning using Cloud Computing

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### Abstract

*E-learning refers to the virtualized distance learning by means of electronic media in education. Cloud computing is the computing in which large group of remote servers are networked to allow centralized data storage and online access to computer resources. E- learning usually requires many resources like hardware and software and many educational institutions cannot afford large investments. And so Cloud computing is the best solution as it delivers the resources as a service over a network (internet). It provides resources via services offered by CSP (cloud service provider). This paper present the benefits of using cloud computing technology in E-Learning, i.e., build an e-learning cloud.*

**Keywords:** Cloud computing, E-Learning, Cloud Service.

### Introduction

Now-a-days technology is increasingly being used both inside and outside of the classroom. So it is very crucial for accepting new technologies and implement their benefits in educational systems. However it is very important to find the benefits and drawbacks of the new technology. The main purpose of this article is to find the potential use of cloud computing in the field of education.

This paper presents cloud computing based solution for building a virtual and personal learning environment which combines a wide range of technology, and tools for education. The article defines what is learning and different learning theories. Following this is a brief introduction on the use of technology (Cloud) in the field of education. The concept of cloud computing is introduced along with its features and advantages of cloud computing technology for e-learning.

### What is learning?

Learning is the act of acquiring knowledge. Human learning may occur as part of education, personal development, schooling, or training. The field of learning is full of many theories and these can be categorized into five main types: humanist, behaviourist, cognitive, social learning and critical reflection.

- Humanists hold the belief that people have unlimited potential for development, and that the objective of learning is to fulfil one's potential. Learning involves an active search for meaning, which is controlled by the learners who know their particular needs and goals.
- Behaviourist's focus on skills development and behavioural change. Learning is seen as a change in overt, observable behaviour. The process of learning is seen as being controlled by stimuli in the external environment from educators and their curriculum, and not by the students themselves. The educator's role is to manage and control the learning environment by setting specific learning objectives and then monitoring the learner's progress. Cognitive and constructivist perspectives of

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learning emphasize the importance of understanding the mental processes involved in learning from the learner's perspective. According to these perspectives learning is seen as changes in the way in which the learner understands or organizes the elements of the environment, and changes in the behavior of the learner are deemphasized. The purpose of learning is seen as the acquisition of knowledge, and the goal of educators is to create the optimal conditions for learning to occur.

- Social learning theory integrates many of the ideas mentioned in the behavioural and cognitive views of learning. It believes that learning is a social process. Most of what people learn is through observations and interactions with other people in a social context. Focus is on the impact of people on people. In this theory the instructor is a model (demonstrator) or identifies and provides effective models, in addition to facilitate social interactions.
- Critical reflection theory focuses on critical reflection and capitalizing on learners' experience. In general, critical reflection involves the learner identifying and evaluating the assumptions, beliefs and values that underlie his or her thoughts, feelings or actions. The emphasis is on learner and instructor equality. The educator is simultaneously teacher and learner.

### **What is E-Learning?**

E-learning is the use of electronic educational technology in learning and technology. The information and communication systems, whether networked learning or not, serve as specific media to implement the learning process. This often involves both out-of-classroom and in-classroom educational experiences via technology, even as advances continue in regard to devices and curriculum. Abbreviations like CBT (Computer-Based Training), IBT (Internet-Based Training) or WBT (Web-Based Training) have been used as synonyms to e-learning.

E-learning is the computer and network-enabled transfer of skills and knowledge. E-learning applications and processes include Web-based learning, computer-based learning, virtual education opportunities and digital collaboration. Content is delivered via the Internet, audio or video tape, satellite TV, and CD-ROM. It can be self-paced or instructor-led and includes media in the form of text, image, animation, streaming video and audio.

E-learning is widely used today on different educational levels: continuous education, company trainings, academic courses, etc. There are various e-learning solutions from open source to commercial. There are at least two entities involved in an e-learning system: the students and the trainers. Some benefits of e-learning are discussed below:

- **Time:** One of the key benefits of online study is that one can learn or take a course through e-learning at any time as it is convenient for them. Podcasts and downloadable lectures mean that students are no longer constricted by a conventional timetable of lectures.
- **Location:** Neither are students restricted by their physical location. With an Internet connection, they can attend live online tutorials, participate in dedicated discussion forums or download course material and notes regardless of where they are.

- **Communication:** Another key advantage of online study is that it encourages and enables students to collaborate and communicate with their fellow students as well as their tutors.
- **Improved training and material costs:** With e-learning, each time the course is accessed our return on investment improves because users are dividing the fixed production costs by number of uses. We also have savings through decreased travel, reduced material, and hopefully improved (and more efficient) performance.
- **Increased productivity:** Because e-learning is not bound by geography or time, you can control training's impact on production by training people during down times. In addition, with the current economy, you're asking people to do more with less. So e-learning is a great way to give them the tools and skills needed to enhance their performance.

### What is Cloud Computing?

Cloud Computing is a technology that uses the internet and central remote servers to maintain data and applications. Cloud computing allows consumers and businesses to use applications without installation and access their personal files at any computer with internet access. This technology allows for much more efficient computing by centralizing data storage, processing and bandwidth.

Cloud computing is the use of computing resources (hardware and software) that are delivered as a service over a network (typically the Internet). The name comes from the use of a cloud-shaped symbol as an abstraction for the complex infrastructure it contains in system diagrams. Cloud computing entrusts remote services with a user's data, software and computation.



Fig : Cloud Computing

The NIST (National Institute Of Science and Technology) lists five essential characteristics of cloud computing: on-demand self-service, broad network access, resource pooling, rapid elasticity or expansion, and measured service.

Cloud computing employs a service driven business model. Cloud offers services that can be grouped into the following categories:

- **Infrastructure as a service (IaaS):** Hardware resources (such as storage) and computing power (CPU and memory) are offered as services to customers. This enables businesses to rent these resources rather than spending money to buy dedicated servers and networking equipment.. As examples in this category, Amazon1 offers S3 for storage, EC2 for computing power, and SQS for network communication for small businesses and individual consumers.
- **Software as a service (SaaS):** In this model, software applications are offered as services on the Internet rather than as software packages to be purchased by individual customers. One of the pioneering providers in this category is Salesforce.com offering its CRM

application as a service. Other examples include Google web-based office applications (word processors, spreadsheets, etc.),

- **Platform as a service (PaaS):** This refers to providing facilities to support the entire application development lifecycle including design, implementation, debugging, testing, deployment, operation and support of rich Web applications and services on the Internet. Most often Internet browsers are used as the development environment. Examples of platforms in this category are Microsoft Azure Services platform<sup>6</sup>, Google App Engine<sup>7</sup>, Salesforce.com Internet Application Development platform<sup>8</sup> and Bungee Connect platform<sup>9</sup>. PaaS enables SaaS users to develop add-ons, and also develop standalone Web based applications, reuse other services and develop collaboratively in a team.

### **Benefits of Using Cloud Computing In E-Learning**

One of the most interesting applications of cloud computing is educational cloud. The educational cloud computing can focus the power of thousands of computers on one problem, allowing researchers search and find models and make discoveries faster than ever. The universities can also open their technology infrastructures to private, public sectors for research advancements. The efficiencies of cloud computing can help universities keep pace with ever-growing resource requirements and energy costs. Students expect their personal mobile devices to connect to campus services for education. Faculty members are asking for efficient access and flexibility when integrating technology into their classes. Researchers want instant access to high performance computing services, without them responsibility of managing a large server and storage farm. The role of cloud computing at university education should not be underestimated as it can provide important gains in offering direct access to a wide range of different academic resources, research applications and educational tools. Usually, E-learning systems are developed as distributed applications, but not limited to. The architecture of an e-learning system, developed as a distributed application, includes a client application, an application server and a database server beside the hardware to support it (client computer, communication infrastructure and servers).

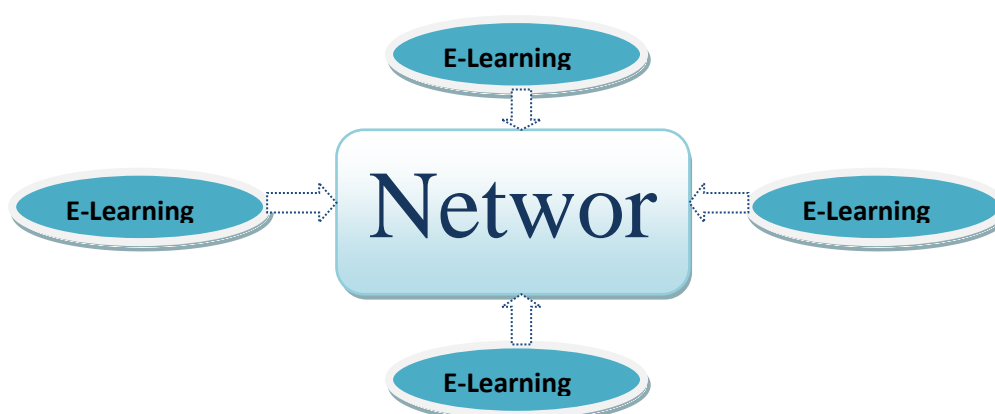
ig : E Learning System

E-learning systems can use benefit from cloud computing using:

- Infrastructure: use an e-learning solution on the provider's infrastructure
- Platform: use and develop an e-learning solution based on the provider's development interface
- Services: use the e-learning solution given by the provider.

### **Key Benefits of Cloud Based E-Learning:**

There are numerous advantages when the e-learning is implemented with the cloud computing technology, they are:



- **Low-priced:** E-Learning users need not have high end configured computers to run the e-learning applications. They can run the applications from cloud through their PC, mobile phones, tablet PC having minimum configuration with internet connectivity. Since the data is created and accessed in the cloud, the user need not spend more money for large memory for data storage in local machines.
- **Improved performance:** Since the cloud based e-learning applications have most of the applications and processes in cloud, client machines do not create problems on performance when they are working.
- **Quick Updation of Software:** Since the cloud based application for e-learning runs with the cloud power, the software's are automatically updated in cloud source. So, always e-learners get updates instantly.
- **Improved document format compatibility:** Since some file formats and fonts do not open properly in some PCs/mobile phones, the cloud powered e-learning applications do not have to worry about those kinds of problems. As the cloud based e-learning applications open the file from cloud.
- **Benefits for students:** Students get more advantages through cloud based e-learning. They can take online courses, attend the online exams, get feedback about the courses from instructors, and send their projects and assignments through online to their teachers.
- **Benefits for teachers:** Teachers also get numerous benefits over cloud based e-learning. Teachers are able to prepare online tests for students, deal and create better content resources for students through content management, assess the tests, homework, projects taken by students, send the feedback and communicate with students through online forums.
- **Information security:** A very big concern is related to the data security because both the software and the data are located on remote servers that can crash or disappear without any additional warnings. Even if it seems not very reasonable, the cloud computing provides some major security benefits for individuals and companies that are using/developing e-learning solutions.

## Conclusion

In conclusion, technology is being used increasingly by institutions to provide e-learning services. These institutions face a wide range of challenges in implementing these systems such as costs, a lack of technical resources, and resistance by key stakeholders to the implementation of systems. Cloud-based learning systems are emerging as an attractive method for providing e-learning services. They can reduce costs due to lower requirements of hardware and software, and less need for onsite maintenance. They are also easier to deploy across multiple locations as they are centrally administered. They also offer benefits to end users in terms of accessibility, security, and compatibility. However, the limitations of cloud-based learning systems are that an Internet connection is mandatory, low speed connections reduce the efficiency of the provision of e-learning services, and issues surrounding the security of a cloud remain unclear. Cloud based education will help the students, staff, Trainers, Institutions and also the learners to a very high extent and mainly students from rural parts of the world will get an opportunity to get the knowledge shared by the professor on other part of the world. Even governments can take initiatives to implement this system in schools and colleges in future and we believe that this will happen soon.

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