



## Cloud Computing Based e-learning Model (CCBEM) for Distance Education through Open University's

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**Abstract**—Cloud computing has become popular IT tool for the services provided by it. The cloud computing provides different services like SaaS, PaaS, IaaS. Cloud Computing is having its remarkable impact in various sectors like IT industry, entertainment, gaming, security issues, military operations, finance etc. Now same cloud computing can be used for the e-learning process of the open universities distance education also. The benefit of using cloud computing in e-learning has will show its new impact on distance education. This paper focuses on the new reforms in distance education with self learning potential through cloud computing based model known as Cloud Computing Based e-learning Model (CCBEM) for Distance Education through Open University's. Generally distance education is preferred when the individual is not able to attend regular classes so the person switches to distance education. To all such individuals (CCBEM) will help them to clear their concepts and get self learned.

**Keywords**—Cloud Computing, E-learning, Distance Education, IaaS, PaaS, SaaS, ICT, Role based.

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### I. INTRODUCTION

The traditional approach of learning is getting collapsed due to the more reforms in e-learning. New methodologies are more in demand like learning through mobiles, laptops, smart phones, pads etc. The e-learning is an important mode of learning today, it plays important role in creating good environment for learning. The CCBEM is good source of content and provides the learner a wide variety of learning materials and learning resources which are made available to learner. The open universities are having n number of students and providing printed material to all those learner, now a days it is not a cost efficient mode of delivering study material to all those learners so switching to e-learning is more preferable. E-Learning is a form of learning in which the teacher/instructor and learner are separated by space or time through the use of online technologies. With web-based learning, it is possible for the learners/teachers to learn from anywhere, anytime, at their pace. Web-based learning brings unprecedented level of accessibility to courses in remote area, courses prohibited by budget constraints, courses updated to recently discovered knowledge, qualified instructors, and instruction at any time[1].

E-learning also needs personalized mechanisms to help learners learn more efficiently. To provide personalized learning strategy is urgently needed for most e-learning systems currently. And the system has to consider learner/user preferences, interests, and browsing behaviors when analyzing learner/user behaviors for personalized services. That is, the ability of individuals may be based on major fields and subjects. Therefore, considering learner ability can promote personalized learning performance [2]. The development of this tool is directly related to the increase of access to the ICT. The learners choose to learn over distance or in person at a traditional campus, the power of e-learning and virtual collaboration is growing fast in education and in the worldwide economy. This power is best realized with a well-planned cloud computing and e-learning strategy. Learners can use the enormous interactivity of innovative media and develop their skills, knowledge, and awareness of the future domain. The benefits of these computing can support education institutions to resolve common challenges such as cost reduction, rapid and effective communication, security, privacy, flexibility and accessibility [3].

Open universities are meant to provide education in distance to several learners who are not able to complete their education in regular. The distance mode of education is more common with the learners who are having full time employment or other reasons. Generally house wife's or girls and other people who are not able to do the full time education prefer to go with distance education.

### II. Cloud Computing

Cloud computing refers to applications and services that run on a distributed network using virtualized resources and accessed by common Internet protocols and networking standards. It is distinguished by the notion that resources are virtual and limitless and that details of the physical systems on which software runs are abstracted from the user.

Cloud computing is a computing model based on networks, especially based on the Internet, whose task is to ensure that users can simply use the computing resources on demand and pay money according to their usage by a metering pattern similar to water and electricity consumption. Therefore, it brings a new business model, where the services it provides are becoming computing resources [4]. Cloud computing is highly scalable and creates virtualized resources that can be made available to users. Users do not require any special knowledge about the concept of Cloud computing to

connect their computers to the server where applications have been installed and use them. Users can communicate through Internet with remote servers. These servers can exchange their computing slots themselves [5]. The cloud is having two essential concepts of abstraction & virtualisation.

#### **A. Cloud Models**

**Models of clouds:** There are different types of clouds that you can subscribe to depending on your needs. As a home user or small business owner, you will most likely use public cloud services.

**1. Public Cloud:** A public cloud can be accessed by any subscriber with an internet connection and access to the cloud space.

**2. Private Cloud:** A private cloud is established for a specific group or organization and limits access to just that group.

**3. Community Cloud:** A community cloud is shared among two or more organizations that have similar cloud requirements.

**4. Hybrid Cloud:** A hybrid cloud is essentially a combination of at least two clouds, where the clouds included are a mixture of public, private, or community.

#### **B. Service Models**

Cloud Services made available to users on demand via the Internet from a cloud computing provider's.

**Software as a Service:** SaaS is a complete operating environment with applications, management, and the user interface. In the SaaS model, the application is provided to the client through a thin client interface (a browser, usually), and the customer's responsibility begins and ends with entering and managing its data and user interaction. Everything from the application down to the infrastructure is the vendor's responsibility.

**Platform as a Service:** PaaS provides virtual machines, operating systems, applications, services, development frameworks, transactions, and control structures. The client can deploy its applications on the cloud infrastructure or use applications that were programmed using languages and tools that are supported by the PaaS service provider. The service provider manages the cloud infrastructure, the operating systems, and the enabling software. The client is responsible for installing and managing the application that it is deploying.

**Infrastructure as a Service:** IaaS provides virtual machines, virtual storage, virtual infrastructure, and other hardware assets as resources that clients can provision. The IaaS service provider manages the entire infrastructure, while the client is responsible for all other aspects of the deployment. This can include the operating system, applications, and user interactions with the system.

### **III. E-LEARNING**

E-Learning is an electronic form of learning. The use of ICT helps in efficient working of e-learning. E-learning includes all form of electronically supported teaching and learning. 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[7].

The two major entities involved in e-learning are

- 1) Student
- 2) Trainer

#### **Benefits of e-Learning:**

**1) Available 24\*7:** The Student can download or see the videos whenever he wants. There is no any time constraint as such in regular learning.

**2) Across the Globe:** The student can use the resource material throughout the globe without having the constraint to the location.

**3) Easy Communication:** The student can interact the teacher or trainer online to clarify the doubts and can also communicate to his fellow students.

### **IV. Open University's Distance Education**

The Open-Distance-Learning (ODL) system is a unique and challenging mode of education offered at the University level. This system provides ample opportunities for those who desire to have University education at their place of work or residence. This method is popularly known as Distance Education. It is perhaps the only way to meet the ever-increasing demand for Higher Education especially in a developing country like India. Distance Education programmes are specially designed for:

- Candidates who discontinue their formal education owing to pecuniary or other circumstances
- Candidates residing in geographically remote areas
- Candidates who cannot get admission to a regular college / Post-graduate department
- Employed persons who cannot pursue their study as full-time candidates
- Individuals who wish to pursue learning for knowledge sake
- Candidates who wish to update knowledge and skills

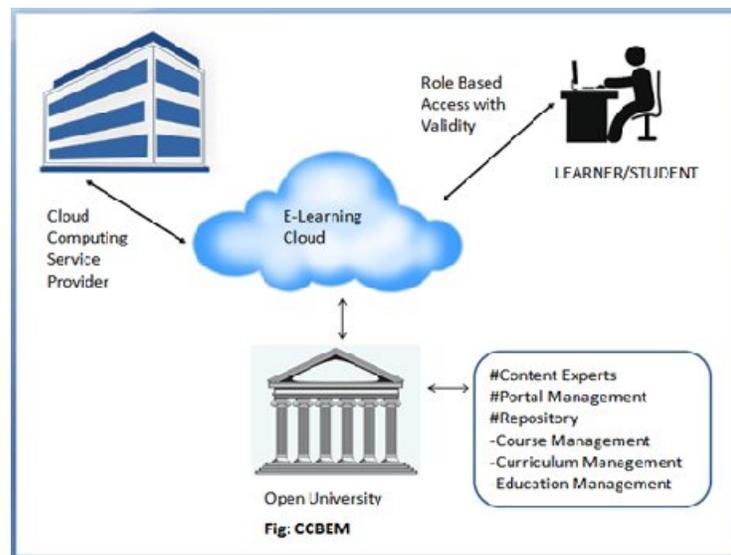
The Open-Distance-Learning (ODL) system is perhaps the only system that has been planned in such a way that it is able to cater to all those who desire to seek Higher Education in spite of the fact that they are in a disadvantageous position due to social, economic, spatial and such other reasons. Also to cater to the increasing demand for Higher Education, flexibilities in terms of age, qualification, location, time, etc., have been introduced to the maximum extent.

#### IV. CCBEM

The proposed Cloud Computing Based E-learning model suggests that every individual who takes an admission will get a user id and password at the time of admission and using that user id and password the student will get registered on the web portal and the user will then get the access to the content available on the web portal only for the subjects for the current year or semester since he has paid tuition fees only for the current year. The data on the E-learning cloud will of two types open access and paid access. The access to other general free material on the web portal will be available for free but the study material will be accessible only after paying the fees for its access.

Since the system is cloud based and having a feature pay as you use, so the students have to directly charge for the resources they are using. This can be done at a very low cost. As soon as the student get passed in particular year then the access to the study material will get nonfunctional since it has been role based. If in case student fails or he is not able to give exams by any of the reason then, the student will have to get paid access to the content by paying a very minimum cost decided by the university. His access will get functional after paying the charges. This will help university to maintain the number of user accessing the portal. The main advantage of this model is it will have a track of number of students in university, access to cloud based web portal. University will also get benefits and motivation for creating new content.

The teachers at the Open University will also have their individual login for the authentication. Teacher can upload and download the course data and material for free of cost without any restrictions. The motivation of keeping some paid services in the CCBEM is that whenever there is data required will be easily available only to authenticated user without any load on the cloud and also this model is using cloud for e-learning purpose and cloud usage will cost some money for its access. The performance of the cloud will also get improved by this strategy. Free forums & blogs are available for discussions and clarification of the doubts. The student can directly interact to the teacher online for clarifying the subject related doubts.



#### VI. Benefits of CCBEM

- 1) Pay as you Use:** Since the model is Cloud based and also role based the amount has to be paid on the usage made by the university (Staff/Student/Teachers).
- 2) 24\*7 availability:** The CCBEM is web based so it is having access 24\*7 of its services
- 3) Improved Accessibility:** Since there are two types of usage in CCBEM one is paid & another is free. The load on the paid side is very low due to the role based model used in CCBEM and cloud can perform more efficiently.
- 4) Paperless Study Material:** Since we are in the edge of technology we can use paperless methods of e-learning. The money wasted in printed matter every year can be saved just by using this CCBEM model.
- 5) Freely & Paid access available:** Some content which is useful for all the kind of user is made available for free of cost all other content is made available based the authentication.
- 6) Role Based Model:** The role based model is used to set the restriction on usage of the content available on the portal.
- 7) Benefits for Students:** Easy and fast access to the course content whenever & where ever required.
- 8) Benefits for Teacher:** Easy and fast access to the course content whenever & where ever required. Teachers can easily upload new course content with their user-id and password.
- 9) Data Security:** Since the data is available only to authorized users the content is secured from all unauthorized access.

**10) Low Cost:** The CCBEM model is having cloud computing & its feature is pay as you use so there is low cost.

## VII. Conclusion

Cloud Computing is replacing the traditional methods of working in all other sectors and also showing its impact in the education sector. Students and teachers can communicate irrespective of location and timing if online. The CCBEM provides a special platform for all the open universities for keeping interaction to students by providing the course content and other facilities to the students. This approach will help open universities saving a huge amount of money from getting wasted on printing of the content for the students which in return after the semester end will get wasted in much of the cases.

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