# Go-All-Green: Adoption of Cloud Computing Technology for Teaching in Universities

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**Abstract: In the last decade there has been tremendous technological development in the field of IT. Everyone wants to adopt IT as a daily usage of their business either in education, health, business or any area of society. Now the world is transforming from an industrial society to a knowledge-based society. Despite all the developments; IT left a very little impact on conception of learning and teaching. In this learning-space educators can supplement current teaching by augmenting classes with aspects of paperless environment and by use of cloud computing and Software as a service (SaaS). Cloud computing makes it possible for learners to interact, simulate, collaborate and do real world problem-solving. Learning will become more interactive – that is, learner-centered instead of teacher-centered. The purpose of this research would be to identify how various course management systems and collaborative tools that could be used as teaching innovation in universities. This research will also explore the challenges and advantages of integrating cloud computing into teaching and learning innovation that leads towards green environment (Go-Green). Go-All-Green would be achieved by adoption of cloud computing technology in teaching innovation at universities. Firstly, by going paperless, trees can be saved from destruction. Secondly, by going towards cloud-computing technology, huge energy of data-center can be saved, which is creating environmental destruction, and ecological imbalance. This research is an important contribution towards innovative learning and teaching for the faculty who seeks the incorporation of cloud computing technology into the courses they teach. By adoption of cloud computing technology; going paperless as a first step and eventually have Green IT with access of documents from anywhere. Hence, the knowledge society which is made by adoption of cloud computing technology helps in making students active and independent learners. The paper will start by general introduction with an overview about cloud computing and its usage in education industry. Then, it will shed some light on creativity and innovation possibilities in educational process. Finally, the paper will close with a conclusion.**

**Keywords: Cloud computing, Paperless teaching environment, Go-Green, Collaborative tools.**

## 1. INTRODUCTION

Cloud Computing is a new technology that discloses the next-generation architecture (Hutchison et al., 2009). This architecture represents a major change in the way information technology (IT) services are invented, developed, deployed, maintained and paid for (Sean et al.,2011).Gartner estimated that cloud market will surpass $148.8 billion by 2014 (Christy et al., 2012). Despite the fact cloud computing technology remains for many an unfamiliar concept. Therefore, if cloud computing is to achieve its potential then there is need to have a clear understanding of the factors that can influence its adoption in business and in universities.

Technology is there but it is not being adopted with its full potential. This research study will contribute to a better understanding of determining constructs (motivational factors and consequences) of new technology adoption. From an educational standpoint, this cloud computing technology can help schools, colleges, universities in having pollution free green environment that is possible by shifting to a paperless environment through transforming teaching material to cloud computing infrastructure in their work. This study can provide practical benefits to information technology practitioners and as regards issues in the successful design and implementation of information technology in education. This research could be an important contribution towards innovative learning and teaching for the faculty who seeks the incorporation of cloud computing technology into the courses they teach and can benefit from the usage; anyplace, anywhere at their ease.

## 2. CREATIVITY AND INNOVATION IN EDUCATIONAL PROCESS

Creativity and innovation in education process could be achieved by having:
- Creativity in educational environment

- Creative care through academic fields
- Creativity in the curriculum

All the above mentioned points will be now explained in detail.

### A. Creativity In Educational Environment

The creativity of the educational environment could be achieved by following most salient points:

- Adoption of cloud computing technology leads to the knowledge based society. Up to date knowledge to learners and educators will be available by using collaborative tools (training videos, literature) which will provide interactive learning platform to stimulate the real world problems and solutions. This will narrow the knowledge gap from professionals to learners; hence moves them from traditional educational system to a knowledge based society.

- Faculty members as well as learners benefit from this by going paperless. The cloud computing technology creates an environment in which learners can access the course material and projects from internet at their ease. The projects will be designed keeping in view the real word problems. Professional community who is part of this knowledge community by use of collaborative tools will help learners in reaching some conclusive research which will eventually be beneficial to the knowledge based society. Those problems will be shared with others in the knowledge society. Hence making the learners competitive in the challenging environment.

- Go-All-Green-Environment creates innovation in teaching by adoption of Course Management System (CMS). Also the creativity could be achieved by adoption of collaborative tools which will eventually help the students in brainstorming and real-world problem solving.

- Faculty members benefit from cloud computing technology by having a paperless environment; all teaching material and exams will be available on cloud so there is ease of making, taking and marking exams. Learner's creativity could be achieved by adoption of collaborative tools which will eventually help them in brainstorming and real-world problem solving.

### B. Creative Care Through Academic Fields

In order to achieve creative care through academic fields, then following methods need to be developed. Which are:

- ❖ Course Management System
- ❖ Collaborative tools for interactive environment
- ❖ Cloud Computing technology

- The **course management system** will be providing all program/ teaching material i.e. moving towards paperless environment. Collaborative tool which is also an innovative tool will be used for interacting the learners with peers, faculty and professionals. Cloud computing technology here is proving platform for course management systems and collaborative tools to be accessed from anywhere, round the clock.

- The society that is created by faculty and students by use of cloud computing in teaching is providing a knowledge sharing platform available to the whole society. All the real world problems that learners/students and professionals pointed out and figured out will be available to the society for reference. Hence all the work will be documented for this knowledge society.

- Knowledge society that is created by **collaborative tools and cloud computing technology** is providing a platform. This platform equipped the students for solving real world problems. That experience will be beneficial to students when they graduate as coming out with experience of problem solving. Also their interaction with professionals in the knowledge society will make it convenient for their placement in the market either locally or internationally.

- The knowledge society mechanism that is created by **cloud computing technology** is promoting creativity and innovation among faculty and students. Also this creativity and innovation is cherished with the professionals as when they come up to some problem they access this knowledge society to have the solution. The interaction of the learners with professionals in the knowledge based society will help learners to get support either in financial, academic support for higher studies or in professional career.

### C.  Creativity In The Curriculum

Creativity in the curriculum is a very crucial step which could be achieved by having:

- The knowledge based society that is created by cloud computing in teaching is transforming from teacher-centered to a student-centered society. Collaborative tools which are integrated in this curriculum will help in developing the creative/critical thinking among the students/learners. Hence integration of these tools helps them to be independent learners.

- Faculty members provide adequate space for students during lectures and non-classroom activities to develop creative thinking skills and promote innovative products.

- Collaborative tools that are used in this knowledge society by cloud computing is helping faculty and learners to meet on common platform, where they can do their lectures and non-class activities. Also this platform could be used in student projects when faculty is not physically available.

- The assessing of degree program performance is generally the satisfaction of the learners and educators; that could be achieved by conducting surveys.

- Transforming from conservative environment to cloud environment will enhance learner's creative skills of problem solving and critical thinking. By the use of this state-of-art technology students/faculty satisfaction will be increased which would result in better rate of students/faculty retention.

Cloud computing technology which will be adopted for creativity and innovation could be adopted by new colleges/universities, existing universities and also by colleges/universities which are near bottle neck in terms of the resources. Following section sheds a light on all the 3 scenarios.

### 3.    CLOUD COMPUTING TECHNOLOGY

"Cloud" is derived from the idea of businesses and users being able to access applications from anywhere in the world on demand. Cloud computing is defined as a collection of disembodied services accessible from anywhere using any mobile device with an internet-based connection. Surveys were completed in 2009 by Gartner analysts on IT trends (especially cloud computing) to show that cloud computing is being used more in the areas of business when compared to other fields (Gartner, 2009). There is no doubt about the paramount potential of cloud computing; according to a recent Merrill Lynch research note, cloud computing is expected to be a "$160-billion addressable market opportunity, including $95 billion in acquired business and productivity applications, and another $65 billion in online advertising" (Hamilton, 2008).

There are three types of proposed cloud deployment models for education sector or for universities.

A **public cloud** is characterized as being available from a third party service provider via the Internet, and is a cost-effective way to deploy IT solutions, especially for small or medium sized colleges/universities. Google Apps is a prominent example of a public cloud that is used by many organizations of all sizes (Sean et. al.2011). This type of cloud is suitable for new colleges/universities which are going to newly start. In adoption of this model they don't have to spend a lot of money on infrastructure. They just apply the things which are immediately required and pay as per usage. No need of big data centers and IT personals. Just need an internet collection, have public cloud and adopt the things like course managements systems and collaborative tools which are required for innovative learning and teaching. Service Line Agreement (SLA) is done with the cloud providing company for continuity of services.

A **private cloud** offers many of the benefits of a public cloud computing environment, such as being elastic and service based, but is managed within an organization. Private clouds provide greater control over the cloud infrastructure, and are

often suitable for larger installations. A private cloud can actually be handled by a third-party provider (Sean et. al.2011).This type of cloud is suitable for existing colleges/universities which wants to avail the benefits of cloud computing without going fully to cloud because of their existing huge investment on infrastructure and data centers and also to have control on their mission critical applications. The just buy the services which are not possible on private cloud.

A **hybrid cloud** is a combination of a public and private cloud — typically, non-critical information is outsourced to the public cloud, while business-critical services and data are kept within the control of the organization (Sean et. al.2011).This type of cloud is also suitable for existing colleges/universities which are near bottle neck and can't provide more services to their users because of limited resources or the existing infrastructure is not robust enough to adopt the new changes in technology. By having hybrid cloud they can retain their existing infrastructure and also have new services from public cloud to meet the ever changing demands of IT and apply the innovative in learning and teaching.
Conceptual Illustration of Cloud

Figure 1 depicts conceptual understanding of clouds. It is an example of Hybrid cloud where one crucial application is placed on premises for security reasons and most or few data is placed on cloud or accessibility.
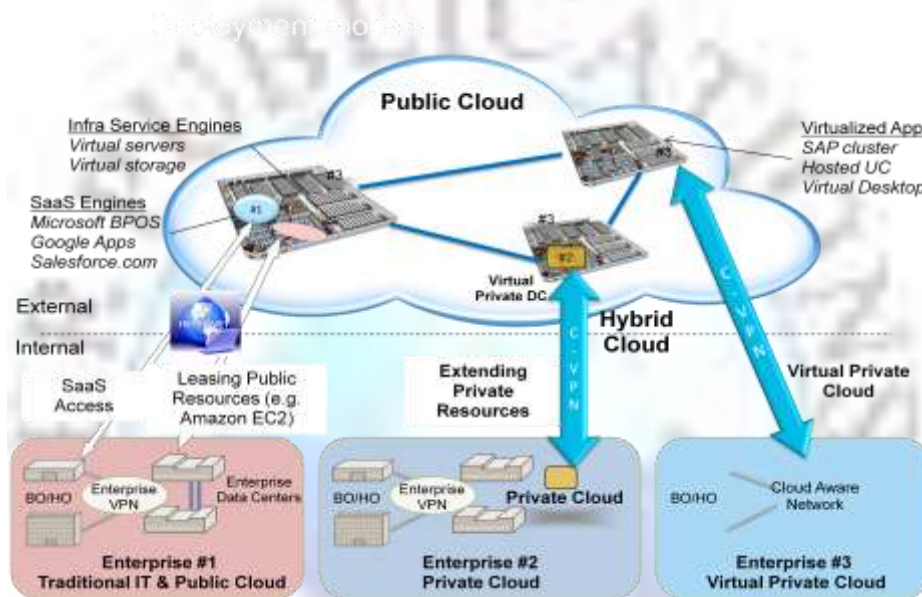


**Figure 1** – Cloud – (Chris,Ciena. 2011)

## 4.   CONCLUSION

This paper has shown the author's perception on the use of cloud computing for teaching in universities. The important points that emerged out of the viewpoint are summarized in the following:

- Go-Green-Environment creates innovation in teaching by adoption of Course Management System (CMS). Also the creativity could be achieved by adoption of collaborative tools which will eventually help the students in brainstorming and real-world problem solving.

- Adoption of Cloud computing technology by the educators makes it possible for learners to interact, simulate, collaborate and do real world problem-solving. Learning will become more interactive –that is, learner-centered instead of teacher-centered and hence the quality of the educational process will be enhanced.

- The collaborative tools could be used for sharing knowledge in the society. The experts from various disciplines could be invited to interact and transform up-to-date knowledge to the learners. Hence the knowledge has been transferred from the professionals to the learners who will be part of the knowledge society. Consequently, the learners will be able to coup up with the international competition.

- As the learners of knowledge society are already up-to-date. Therefore, they can compete for various positions at national and international levels.

- The adoption of collaborative tools will enhance the services such as ease of use, improved quality, reliability, 24/7 availability –anywhere & any place. Hence this will improve learners and educators satisfaction in Universities.

- The knowledge society developed by collaborative tools will create partnership of professionals and expertise. Their expertise will share their experience & knowledge and will come up with solutions of any problem.

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