CLOUD BASED TEACHING AND LEARNING ENVIRONMENT FOR QUALITY EDUCATION

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Abstract:*Education is nowadays going beyond classrooms. The advent of cloud computing has set new platforms for innovative teaching and learning practices. The education is now more technology oriented and here the cloud is the latest technology which had established. Following various research areas in cloud computing I propose to introduce an innovative teaching practice for teachers using the sharp features of cloud computing. Generally cloud computing comes in three different approaches i.e. private, public and community clouds of which various environments can be implement that is Software as a services (SAAS), Platform as a service (PAAS), and Infrastructure as a service (IAAS). In education each of these 3 models plays an important role in general education transformation. By storing complex Information technology (IT) infrastructure on remote servers cloud vendors make advanced computing tools available to institutions, companies or organizations at low prices which is what contributed to a rapid adaption of these services. Additionally new provisioning models have triggered proliferation of various cost-efficient business intelligence software programs, collaborative platforms and web applications, the adoption of which is often seen as a major form of innovation in different settings, including education. A set of turbulence in the education sector was triggered by the emergence of cloud computing technology, which took the world wide classrooms by storm and reshaped most of the processes related to learning, teaching and administration. The educational institutions all over the world have already adopted the cloud to their own settings and made use of its great potential for innovation. This paper introduces a quality education purpose built platform using SAAS, PAAS,IAAS and private cloud to experiences a quality teaching and learning system which is an innovative concept in the field of education.*

Key Words: Cloud computing, Quality education, SAAS, PASS, IAAS and private cloud.

Introduction

The concept of cloud computing has its various interpretations and applications, but it primarily refers to technology that delivers powerful computing resources via the web. The benefits of introducing these systems are most frequently discussed in relation to business, but its impact on the education sector is no less significant. Educational institutions all over the world have already adapted the cloud to their own settings and made use of its great potential for innovation. Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort.

Although the cloud includes a broad set of different services, its most widely used applications are:

- ➢ Email services such as Gmail or Yahoo! Mail
- ➢ Online data storage solutions such as Drop box or Box
- ➢ Other kinds of applications accessible online.

When discussing the applications of cloud computing technology it is important to mention its three most important categories: a) **Software-as-a-Service (SaaS),** which refers to any type of software program that is managed remotely and delivered via the web; b) **Platform-as-a-Service (PaaS)**, which includes a set of application infrastructure services, such as platform and OS, that are rented from a vendor, and c) **Infrastructure-as-a-Service (IaaS)** that is yet another provisioning model for outsourcing compute resources on demand. In education, each of these three models plays an important role in general education transformation. By storing complex IT infrastructure on remote servers, cloud vendors make advanced computing tools available to institutions, companies or organizations at low prices, which is what contributed to a rapid adoption of these services. Additionally, new provisioning models have triggered proliferation of various cost-efficient business intelligence software programs, collaborative platforms and web applications, the adoption of which is often seen as a major form of innovation in different settings, including quality education.

CLOUD COMPUTING:

The National Institute of Standards and Technology (NIST) defines cloud computing as a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of

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configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. The term **cloud computing** is a new phenomenon that appears to be **linked to Web**. The user has access to a number oflearning practices were being followed. Then was introduced the concept of e-learning. The tools of information and communication technology were being used the advancement of quality education. Students could watch instructional video; download learning materials or online communication with teachers and other operations, which was the innovativeness in the traditional teaching environment. In the network teaching process, students can learn anytime, anywhere to break through the traditional teaching of the simple way to acquire knowledge, to better train students in the initiative, highlighting the individual student learning.

Cloud in quality education environment:

The following are some advantages of using cloud in quality education·

- ➢ Significant cost reduction
- ➢ Access to application from anywhere.
- ➢ Support for teaching and learning.
- ➢ Increase openness to students to new technologies.
- ➢ Offline usage.
- ➢ Opening to advance research.

We are using different service models like IaaS, PaaS and SaaS of cloud with different deployment model like public, private, hybrid and community clouds in our teaching and learning process among the different model in our research paper we are mainly focus on IaaS(Infrastructure as a service) withPrivate deployment models. As we have proposed to use **IaaS**of cloud in our educationenvironment it offers the infrastructure that is required for teaching and learning "**use as you pay on**" basis or sometimes with free of cost. The private cloud models are normally designed for a single organization or university .Different departments of a university can share its services. It is moresecured than all the other models and the main advantage of using private cloud is that authenticated to specific users only means it is very useful to the security purpose of the data. Due to lack of attention to few rural schools education, not all rural schools are getting quality education. Some of them are suffering from proper guidelines, right direction in learning and choosing the study and subject materials. It is necessary for rural school education systems to have proper guidelines, direction,quality teaching, subject materials and other. Maintaining experts and quality teaching in every rural school are very difficult.

### Cloud Computing Technologies for Rural Education:

Virtualization is a foundation for cloud computing technology. This technology provides software, hardware, infrastructure and storage as services. Cloud DSaaS and IaaS are especially suitable for rural application. Data Storage as a Service **-** A teaching database can be established making modern network of teaching resource and digital library building from where many can learn. The cloud can contain online e-books, teaching materials, directions, courseware and various educational videos etc. Infrastructure as a service: To avail various operating systems environment, network and storages. Many services can be provided by the school clouds system such as: online videos, course material, interactive learning games, online training, Cloud computing is Internet-based computing in which shared resources, software and information are delivered as a service that computers or mobile devices can access on demand. **The cloud computing is a culmination of numerousattempts at large scale computing with seamless access tovirtually limitless resources.** Cloud computing is already used extensively in education. Free or low-cost cloud-based services are used daily by learners and educators to support learning, social interaction, content creation, publishing and collaboration. Examples of cloud-based services include Google Apps, YouTube, Twitter and Drop box. Presentation etc.,
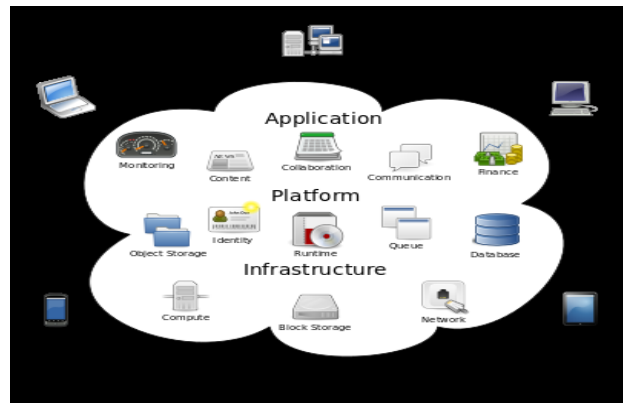
Benefits of implementing cloud technologies:

Educational institutions are among many organizations that find cloud computing systems useful for simplifying admission and administration processes, as well as improving general staff communication. By outsourcing infrastructure, platform or software as a service, educational institutions can benefit in terms of both cost reduction and efficiency. As reported by most of the organizations currently using the cloud, the primary benefit of this platform is its cost-efficiency. The cloud represents an ideal place for large organizations to store, process and analyze data because it requires minimum hardware investments. Besides this by implementing we can imagine our future in which the majority of educational services will be hosted in

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the cloud and institutions no longer have their own data centers with expensive hardware, power bills, and computing resources which are rarely fully utilized. Here we have analyzed some of the emerging benefits and challenges of cloud computing for the educational sector. In most of the government schools and colleges in India IT plays very limited role. Most of the work is done manually from attendance to classroom teaching to examination system. Cloud computing technology provides solution to various problems being faced by everyone in the education system. Cloud computing facilitate users to control and access data through the Internet. The main users of a typical higher education cloud include students, Faculty, administrative staff, Examination Branch and Admission Branch. All the main users of the institution are connected to the cloud Separate login is provided for all the users for their respective work see in figure.
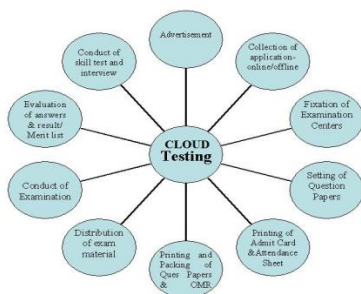
Cloud collaboration:

Is a newly emerging way of sharing and co-authoring computer files through the use of cloud computing, whereby documents are uploaded to a central "cloud" for storage, where they can then be accessed by other.New cloud collaboration technologies have allowed users to upload, comment and collaborate on documents and even amend the document itself, evolving the document within the cloud. Collaboration, in this case, refers to the ability of people in an organization to work together simultaneously on a particular task. In the past, most document collaboration would have to be completed face to face. However, collaboration has become more complex, with the need to work with people all over the world in real time on a variety of different types of documents, using different devices. While growth in the collaboration sector is still growing rapidly, it has been noted that the uptake of cloud collaboration services has reached a point where it is less to do with the ability of current technology, and more to do with the reluctance of workers to collaborate in this way. Teachers can upload their class Tutorials, assignments, and tests on the cloud server which students will be able to access all the teaching material provided by the teachers via Internet using computers and other electronic devices both at home and college and 24x7. The education system will make it possible for teachers to identify problem areas in

which students tend to make mistakes, by analyzing students' study records. In doing so, it will also allow teachers to improve teaching materials and methods. This will not only make it possible for students to use online teaching materials during class but they will also be able to access these materials at home, using them to prepare for and review lessons.

Leading cloud providers have recognized the importance of adjusting their computing services specifically to the needs of educational institutions. These include customized software packages at low prices that more institutions can afford. Some of the most widely used educational platforms are listed below.

Microsoft for Education:

Microsoft is one of the companies whose services have been reforming education for more than two decades. The Microsoft's cloud is currently available to the educational institutions in the following forms: Office 365 for Education (formerly Microsoft live@edu), Business Productivity Online Suite (BPOS), Exchange Hosted Services, Microsoft Dynamics CRM Online and Office Web Apps. Microsoft Office 365 Education, a cloud-based communication and collaboration tool is currently used by 110 million students, faculty and staff (March, 2014).

Google Apps for Education:

Google Apps for Education is a widely used platform for outsourcing free web-based email, calendar and documents for collaborative study. Google has initiated two important campaigns for introducing improvements in the education sector. 72 of the top 100 U.S. Universities used Google Apps for Education in 2012, while Chrome books entered 2000 schools in 2013.

Chrome books for Educationare one of the most important Google's projects aimed at education innovation. Malaysian Ministry of Education has recently joined the project and introduced 4G high-speed internet access and Samsung Chromebooks in 10,000 national schools in 2013.

Another important Google's initiative is *Tablets with Google Play for Education*, which enable educators to smoothly implement the latest technology solutions into classrooms and make useful apps available to their students.

AWS in Education:

Amazon's AWS cloud is an education-friendly set of services that provides cost-efficient solutions to universities, community colleges, vocational schools and K-12 schools and districts. AWS users have at their disposal computing and storage resources that contribute to a creation of flexible IT infrastructure in these institutions. The global community of AWS education services has reached the number of 2,400 schools in 2013.

Higher Education and the Cloud:

"Higher education has always been about more than information, no matter how quickly that information can be disseminated or how much of that information can be stored.

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Our institutions have always been communities driven by connections among faculty, students, research, education, disciplines, communities, and the institutions themselves. In the connected age, it doesn't matter where the information is, where the student is, or where the faculty member is. What matters is the value that comes from the connection. In the connected age, data, collaboration tools, and communities can come together in ways never before possible. Technology makes the connected age possible." Cloud adoption has particularly affected the higher education sector, where the benefits of introducing these innovative systems are even more conspicuous.

As outlined in the table below, they identified the nine major benefits and limitations of using cloud computing in education. The summary of their conclusions is given in the table below.

BENFITS	LIMITIONS
Access to application form any where	Not all applications run in cloud.
Support for teaching and learning.	Risks related to data protection and security and accounts management.
Software free or pay per use.	
24 hours access to infrastructure a	Organizational support.
Opening to business environmen research.	Dissemination politics, intellectual property.
Protection of the environment by technologies.	
Increased openness of students t	Security and protection of sensitive data.
Increasing functional capabilitie	Maturity ofsolutions.
	Lack of confidence.
Offline usage with further synch opportunities.	Standards adherence.
	Speed/lack of Internet can affect work methods.

Psychology Based Technology Theories:

Vygotsky's Sociocultural Theory:

Vygotsky's sociocultural theory of human learning describes learning as a social process and the origination of human intelligence in society or culture. The major theme of Vygotsky's theoretical framework is that social interaction plays a fundamental role in the development of cognition. Vygotsky believed everything is learned on two levels. First, through interaction with others, and then integrated into the individual's mental structure.

Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (inter-psychological) and then inside the child (intra-psychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relationships between individuals. (Vygotsky, 1978, p.57)

A second aspect of Vygotsky's theory is the idea that the potential for cognitive development is limited to a "zone of proximal development" (ZPD). This "zone" is the area of exploration for which the student is cognitively prepared, but requires help and social interaction to fully develop (Briner, 1999). A teacher or more experienced peer is able to provide the learner with "scaffolding" to support the student's evolving understanding of knowledge domains or development of complex skills. Collaborative learning, discourse, modeling, and scaffolding are strategies for supporting the intellectual knowledge and skills of learners and facilitating intentional learning. The implications of Vygotsky theory are that learners should be provided with socially rich environments in which to explore knowledge domains with their fellow students, teachers and outside experts. ICTs can be used to support the learning environment by providing tools for discourse, discussions, collaborative writing, and problem-solving, and by providing online support systems to scaffold students' evolving understanding and cognitive growth.

Jean Piaget's theory of cognitive development:

Based on his research on the development of children's cognitive functions, Piaget's work is regarded by many as the founding principles of constructivist theory. He observed that learning occurs through adaptation to interactions with the environment. Disequilibrium (mental conflict which demands resolution) gives rise to Assimilation of a new experience, which is added to the existing knowledge of the learner, or to Accommodation, which is modification of existing understanding to provide for the new experience. Specifically, Piaget posited that the existing cognitive structures of the learner determine how new information is perceived and processed. If the new

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information makes sense to the existing mental structure of the learner, then the new information item is incorporated into the structure (i.e., Assimilation). If, however, the data are very different from the existing mental structure of the learner, they are either rejected or transformed in ways so that it fits into the structure (i.e., Accommodation). The learner has an active role in constructing his or her own knowledge in both of these ideas. He observed that, as children assimilated new information into their existing mental structures, their ideas gained complexity and power, and their understanding of the world grew in richness and depth. These ideas are core concepts of the constructivism view of the learning process. (Jean Piaget Society, 2001).

Jerome Bruner's learning theory:
Similar to Piaget, Bruner emphasized that learning is an active process in which learners construct new ideas or concepts based upon their prior knowledge and experience. He identified three principles to guide the development of instruction. These include: (1) instruction must be concerned with the experiences and contexts that make the student willing and able to learn (readiness); (2) instruction must be structured so that the student can easily grasp it (spiral organization); and, (3) instruction should be designed to facilitate extrapolation and/or fill in the gaps (going beyond the information given).

Instructional approaches for technology integrated constructivist learning

Constructivist learning theory suggests that teachers must understand what learners bring to the learning situation and begin there in helping students build new knowledge. For example, students can use word-processing software or e-mail to share their understandings with student peers as well as teachers. These uses of technology have been demonstrated to improve writing skills, produce more and better ideas for decision making, and increase motivation

A Framework for Creating a Learning Environment for the 21st Century Classroom

We can create a learning environment by integrating constructivist theory and information and communication technologies into our educational institutions. This will be made possible by
- developing greater motivation among the teachers;
- making workforce more flexible and creative;
- reducing isolation among teachers;
- making teacher a facilitator of knowledge construction;
- improving social interaction among the students;
- sharing knowledge between the students and teacher and among the students;
- sharing responsibility for the total development of

students and collective responsibility for students' success;
- developing interdependency and interdisciplinary approach;
- changing the role of the student, teacher and community;
- Implementing the framework of content, pedagogy and technology integration in the classroom;
- Providing access to the information resources and focusing on learning with technology; and
- Encouraging innovation and creativity in the classroom.

Suggestions:

- Government investment in digital education has achieved widespread change in the experience and content of learning for many students.

- Rapid uptake of smart devices, combined with declining cost support the move to a 'bring your own device' environment.

- Pedagogy must drive innovation in digital education.

- Creating new learning environments demands a systems approach including building teacher capacity and new curriculum design.

- Digital technologies should be utilized to enhance social inclusion and facilitate student-centered learning.

- The private sector has an important role to play in the future of digital education.

- The most effective public-private partnerships in education are those that share risk and reward.

- Digital learning is most successful when it combines formal and informal learning.

- While the level of change required in schools is significant, it is best supported in the short to medium term by changing the emphasis of existing curricula and assessment.

The new digital education environment will look and function very differently. In addition to classroom teaching, staff will develop new ways of teaching that embrace digital

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education, and 'bring your own device' learning models will be integrated into the learning environment. Strong leadership in schools will be needed to support this new environment, to increase teacher capacity and to support the uptake of digital education in schools. Learning will extend beyond the school to encompass the home, parents and experts located in industry, universities and elsewhere. Social media tools will be increasingly deployed to enrich and extend learning experiences. To maximize the benefits from digital education, school learning and teaching plans must reflect the nature of digital learning and teaching and reach out to partners in industry and the broader community. Public-private partnerships in education can help make learning more relevant and authentic by involving the community, local businesses and other education sectors. By working with external experts, learners and their teachers can start to see where their learning relates more clearly to their lives and their community, and hence become more motivated and engaged. In education, each of these three models plays an important role in general education transformation. By storing complex IT infrastructure on remote servers, cloud vendors make advanced computing tools available to institutions, companies or organizations at low prices, which is what contributed to a rapid adoption of these services. Additionally, new provisioning models have triggered proliferation of various cost-efficient business intelligence software programs, collaborative platforms and web applications, the adoption of which is often seen as a major form of innovation in different settings, including education. Leading cloud providers have recognized the importance of adjusting their computing services specifically to the needs of educational institutions. These include customized software packages at low prices that more institutions can afford. Some of the most widely used educational platforms are listed below.

Conclusion:

This paper studies about cloud based teaching for quality education and support for cloud with quality education.Although still quite a vague term for some, cloud computing is definitely one of the major innovations that entered worldwide classrooms in recent years. With the ability to cut IT costs and at the same time creates a modern collaborative environment, educational institutions can see some important benefits from moving to the cloud. Modernizing learning processes and introducing the latest technologies in classrooms encourage students to develop skills and knowledge necessary for achieving their academic and professional goals. From this perspective, it is obvious how valuable a resource the cloud is in the education sector. Together with other forms of technology implementation, the cloud can substantially increase learning opportunities for students all over the world, and eventually contribute to equipping future generations with skills and competences necessary for international career advancements.

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