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**E-Learning by Cloud Computing-Challenges, Benefits and changes: a case study of Al-Medina International University**

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**Abstract**

Cloud Computing has now become the next stage of internet's evolution providing solutions from computing power to computing infrastructure, applications, business processes to education. The "cloud" in cloud computing is a set of hardware, network, storage, services which served over the internet from shared data centers using enormous economies of scale. To get a system which is secure, easily managed and cost-efficient we can use Cloud Computing, where instead of purchasing a huge lot of computers, we can now outsource computing from the remote cloud and pay as we use the service. As quoted by Steve Moore IT Director of Centur .Moving to the Cloud is completely cost-neutral due to the savings that has been incurred and there is perfectly no demarcation between users accessing data stored on a local server and users accessing data stored in Cloud infrastructure. My main objective of the paper is to present a case study of an institutions grappled by severe IT issues which were hampering its efficiency .Here I want to find the challenges, benefits and change E-Learning will provide to the learners so they can become the digital citizens. The data collected is by primary and secondary method. I have tried to find the challenges in the path, the benefits after adopting Cloud Technology ,security issues and the changes it brought by providing a solution to the present which is future-ready.

**Keywords:** Cloud Computing, E-Learning, Online Learning, Learning in Cloud, Al-Madinah International University, Challenges, Benefits and changes in E-Learning

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**Introduction**

Cloud Computing is a revolution in the innovation for education by providing internet in real time environment. This E-Learning Environment can be achieved by Cloud Computing. Cloud computing (CC) is an evolving term or paradigm, implying the use of configurable computing resources (hardware, software, and network) with its purpose to offer a service to a consumer [1]. By enabling ubiquitous, convenient, on-demand network access [1], its underlying business model contains at least two actors [2]. CC is a phrase used to describe a variety of **computing** concepts that involve a large number of computers connected through a real-time communication network such as the Internet.[3] The word cloud computing can be used for distributed computing over a network. It actually means the ability to run a program or application on many connected computers at the same time. It is a kind of network-based services appearing to be provided by real server hardware but it is actually served up by

virtual hardware which is simulated by software running on one or may be more real machines. So we see here that these virtual servers do not physically exist but they can be moved around and scaled up or down on the fly without any effect on the users, so it is acting just like a cloud.

The term 'Cloud Computing' is basically due to its marketing for selling the hosted services like application service provisioning which run client server software on a remote location that is cloud. The Cloud Computing has services known by popular acronyms like 'SaaS' (software as a service), 'PaaS' (platform as a service), 'IaaS' (infrastructure as a service), 'HaaS' (hardware as a service) and finally 'EaaS' (everything as a service). The users access these cloud-based applications through a web browser, thin client or mobile app at the same time the business software and user's data are stored on servers which are at a remote location. In Amazon web services and Google App engine users are allocated space for distribution and managing

software in the cloud. The main focus of the paper is to present a case study of an institutions which had to deal severe IT issues which were restricting its efficiency .Here we find the challenges, benefits and change E-Learning will provide to the learners so they can become the digital citizens.

### Statement of the Problem

Although Cloud Computing has been researched, yet its impact in education still needs to be probed further regarding the challenges, benefits and solutions for further improvement. Our study was based on educational institution Al-Medinah International University which was established in 2007.Its main intension was to alleviate teachings on-line and on-campus. The institution had over 347 employees, 3,000 students across 95 nations by on-line learning and e-learning tools

### Issues

Its main issues were (1) Finding a way to store huge amounts of valuable education securely.(2) Helping the students and teachers spread across the world to access this great content anytime from anywhere.

### Consideration

As their main consideration was anywhere access, best value for the limited IT Budget, All-in-one-solution.

#### **Solution 1:**

They took the help of Microsoft and Google in this regard .A Pilot Project was taken where a mix of Google Apps (filing) was used for course work and Microsoft Exchange was used for email.

#### **Drawback**

It was found that even this was ineffective and did not work as it was not an integrated all-in-one solution . So there was a need to change.

#### **Solution 2:**

A change for the better was provided by Microsoft 365, which provided a secure single solution that helped their team for collaborating and working together from anywhere. It worked seamlessly with backend system running Microsoft solutions like Microsoft Dynamics CRM, Microsoft Dynamics Rx and the Moodle LMS.[5]

We studied the case of this university , identified the problem and the paper is an effort to provide here the challenges faced by the institution, benefits and changes E-learning would provide to the students now and in the future.

## Al-Medinah international University: an overview

### Profile

MEDIU (Medinah International University) is a nonprofit, independent International Education institution which is located at Malaysia. Established in 2006 it was based on the Islamic principles .Its values were based by putting forward a structure which built a platform for the knowledge seekers and the knowledge generation by preserving the ethical values with a mission to serve the world. It was licensed by the Malaysian Ministry of Higher Education (MOHE) with all its programs further accredited by the Malaysian Qualification Agency (MQA).The University is managed by its Rector Prof. Dr Mohammad Khalifa Al-Tamimi and the elite scholars who are the Board of Governors.

### History

- It was on 20 May 2007; MEDIU was registered and accredited by the Malaysian Ministry of Higher Education (MOHE).[4]
- In 2008, a first batch of students joined the university .The faculties and programs such as Islamic Sciences, Languages, Finance and Administrative Sciences, and Computer and Informational Technology and Centre of Languages were inaugurated.[4]
- The university had nine centers which are located at South East Asia, Middle East and Europe.
- The university had completed all the procedures to begin face to face learning in scientific and applied branches including computer science, Finance, Administrative sciences and Engineering.
- In September, 2010 the university had its first face to face intake of students.
- The graduation day was held in 2011 with its first batch of graduate students by Faculty of Languages and Faculty of Islamic Sciences.
- It was in the year 2012, **MEDIU** has signed a memorandum with the Granada International College (GIC) in the field of education development.
- In the year 2013, MARA had approved the registration and sponsorship program for the degree level courses at Al-Medinah International University (MEDIU) in the field of Islamic Sciences and Arabic

languages under the MARA study loan scheme.

#### **Kinds of Studies**

There are two kind of learning at Medinah International University such as-

- Distance-Learning or On-Line learning which is supported by all forms of electronically supported learning and teaching, including Edtech. In On-Line learning both out-of-classroom and in-classroom educational experiences are learnt through technology.
- On-Campus Learning at MEDIU has the educational programs for the student where they have to physically move to a specific campus at a specific time to follow the programs, with the help of the teacher, professor, or teaching assistant.

**Learning Centres(LC) and Premises:** Keeping in mind ‘modernization’ and ‘long term development’ of university for improving education and facilitating the students they are referred to each of their

learning centers for updating with exam schedule and other news feeds through their own learning centers. The learning centers are located in -LC Saudi Arabia, LC Kuwait, LC Egypt, LC London, LC Morocco, LC Makassar, LC Yogyakarta, LC Thailand and LC Malaysia. These Learning Centers have their respective Premises in the following places-Malaysia, Indonesia, Singapore, Thailand, Saudi Arabia, Kuwait, U.K and Morocco

#### **Literature Review**

Before we begin our study for the studies we found the literature review about what Cloud computing is? “I realized that what I was standing in was a prototype of a new kind of power plant – a computing power plant that would come to power our information age the way great electric plants powered the industrial age.” Nicolas Carr, the Big Switch [6]. So Cloud computing (CC) relates to the online hosted services which are accessed by the internet this has been given the metaphor as a ‘cloud’. The GUI (graphical user interface) is provided by the user’s web browser.

“Basically, cloud computing is storing your data on someone else’s computer and accessing it via a network.” Bruce Schneier, CTO of BT and renowned security expert. [6]

This concept had been prevalent since 1960’s but presently due to broadband internet, Virtualization [http:// www.ijesrt.com](http://www.ijesrt.com)

and latest models for delivery of web based services it has gained such an uproar.

#### **Challenges**

At Gartner Emerging Trends Symposium/ITxpo, Gartner analysts identified seven IT grand challenges. According to him if these challenges are met it will have quite an effect on the economic, scientific and societal impacts. These challenges are-

- (i) Eliminate the need to manually recharge wireless devices
- (ii) Parallel programming applications that fully exploit multi core processors
- (iii) Non-tactile, natural computing interfaces
- (iv) Automated computer-to-human speech translation
- (v) Reliable, long-term digital storage
- (vi) Increase programmer productivity by 100 percent
- (vii) Identify the financial consequences of IT investments.

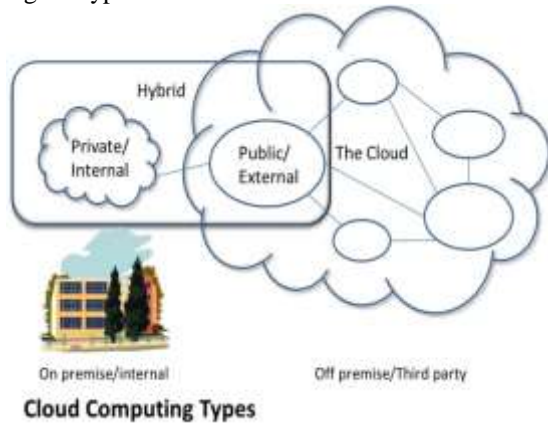
“IT leaders should always be looking ahead for the emerging technologies that will have a dramatic Impact on their business, and information on many of these future innovations are already in some public domain,” says Gartner VP Ken Mc Gee [10]

#### **Benefits**

According to NIST (National Institute of Standards and Technology) the following definitions are used for deployment models (National Institute of Standards and Technology, 2011, p. 3): [7]

- i) Private cloud. The cloud infrastructure is solely operated for an organization. It may be managed by the organization or a third party and may exist on premise or off premise.
- ii) Community cloud. The cloud infrastructure is shared by several organizations and supports a specific community that has shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be managed by the organizations or a third party and may exist on premise or off premise.
- iii) Public cloud. The cloud infrastructure is made available to the general public or a large industry group and is owned by an organization selling cloud services.
- iv) Hybrid cloud. The cloud infrastructure is a composition of two or more clouds (private, community, or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds)[19]

Fig-1: Types of Cloud

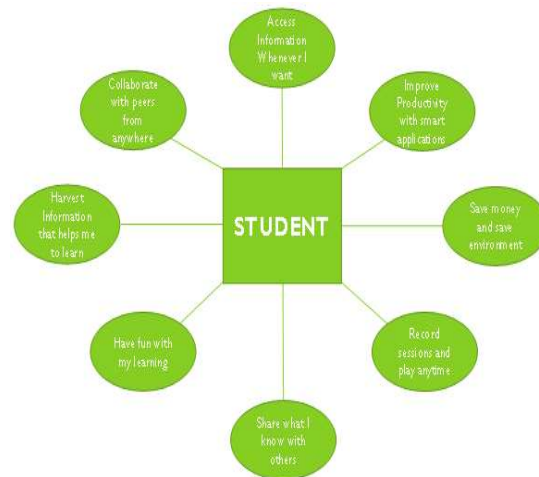


Cloud computing use in Higher Education is still a debatable issue with several challenges in addition to benefits. Cloud Computing depends on the different types of deployment models used. The public cloud is a group of computer and service of computer network according to Cloud Computing Model, where the service provider makes resources which is accessible to the public for use

over the internet. The private cloud is a platform which works within a company's firewall and is managed by their own IT department. Though the private Cloud has the same features as the public Cloud Computing systems, its main aim is to remove the security issues pertaining to the public cloud. A hybrid cloud is a cloud computing environment where the organization manages its own personal and sensitive data and uses the public cloud for certain applications like email.

Hence the selection of a cloud deployment model is one of the major decision of higher education IT managers. Universities may have their own private cloud for their own consumption, and even offer hosting services for other universities to generate revenue. For a smaller college it will be more beneficial to simply adopt applications and services thus enabling the college to skip a whole generation of academic computing and reducing the costly and debilitating challenges.

Fig-2: Benefits of Cloud Computing



Source:

<http://blogs.technet.com/b/ptsblog/archive/2011/08/07/mobile-computing-in-education.aspx>

Further the literature reveals that, the first cloud services in education were application service providers (ASPs) (Wikipedia, 2012) [30] providing computing services to small institutions to run their Learning Management systems. [8] The report by Gartner again provides more information about plans to use Cloud Services by higher education CIOs from 2011 to 2012. [9]

- SAAS - increase of 33% – the majority of this is free email for student services
- PAAS – increase of 183%
- IAAS – increase of 167%

Fig:3

Cloud Computing as Gartner Sees It



Source: Gartner AAG1 Screens Dec 2009

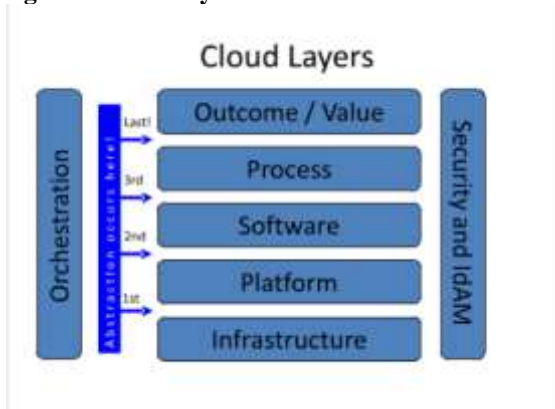
Source: [developers.google.com](http://developers.google.com)

In an attempt to obtain a comprehensive understanding of cloud computing and its relevant components, Youseff, Butrico and Da Silva (2008) were among the first who suggested a unified ontology of cloud computing. Cloud Computing (see Figure 4) fall into one of the following five layers:



applications, software environment, software infrastructure, software kernel, and hardware. Each layer represents a level of abstraction, hiding the user from all underlying components and thus providing simplified access to the resources or functionality.

Fig-4: Layers of Cloud



Source: The Security Blog ,Clearing the Cloud Part II.,”A Ray of Sunshine” from [www.arielsilverstone.com](http://www.arielsilverstone.com)

**C.Security Issues**

Cloud computing is an emerging technology by sharing resources, lowering cost and relying on pay as per use by user’s demand. Due to many characteristics it has effect on IT budget and also impact on security, privacy and security issues. **There are risks too, especially from privacy and intellectual property rights issues.** (Lowendahl, 2012, p. 1) In Canada, the US Patriot Act and provincial privacy laws are particularly restrictive regarding personal identifiable information (PII) to organizations seeking to leverage cloud based services. In British Columbia, the legislation is called “Freedom of Information and Protection of Privacy Act” (FIPPA).

As regards the implementation risks, a research conducted by the IDC Enterprise Panel[29] concluded that the primary concerns about adoption in higher education are: security, performance and availability, not enough ability to customize, worried on-demand will cost more, bringing back in-house may be difficult, regulatory requirements prohibit loud, and not enough major suppliers. According to a study conducted by EDUCAUSE based on 372 member institutions [30] are considered top barriers. Likewise, approximately 75% of Chief Information Officer and IT specialists consider security as being

the number one risk [27]. The most important risks regarding security are: loss of governance, lock-in, isolation failure, compliance risks, management interface compromise, data protection, insecure or incomplete data deletion, and malicious insider[28] (Catteddu and Hogben, 2009)yet Some of the security issues are also –



Figure 5 - Taxation of security requirement (Fire smith, 2004)

(i) **Privacy Issues:** It is the human right to secure his private and sensitive information. In cloud context privacy occur according to the cloud deployment model [11].There is lack of user control on the data.  
(ii) **No User Control:** Thus in SAAS environment service provider is responsible to control data. Now how customer can retain its control on data when information is processed or stored. It is legal requirement of him and also to make trust between customer and vendor [11]. In this new paradigm user sensitive information and data is processed in ‘the cloud’ on systems having no any, therefore they have danger of misuse, theft or illegal resale. Adding more, this is not patent that it will be possible for a CSP to guarantee that a data subject can get access to all his/her PII, or to comply with a request for deletion of all his/her data. This can be difficult to get data back from the cloud, and avoid vendor lock-in [12].

(iii) **Unauthorized access to data:** There is unauthorized use of data as one of the threats can occur if information is placed for illegal uses. Cloud computing standard business model tells that the service provider can achieve profits from authorized secondary uses of users’ data, mostly the targeting of commercials [13].Now a days there are no technological barriers for secondary uses. In addition, it has the connected issue of financial flexibility of the CSPs: for example, possibility of vendor termination, and if cloud computing provider is

bankrupted or another company get data then what would happen [14]. Cloud has vibrant nature so there is no clear aspect that which one is legally responsible to ensure privacy of sensitive data put by customer on cloud [13].

Some of the security concerns of Public Cloud are-

(i) **Access:** It has the threat of access sensitive information. The risk of data theft from machine has more chances in cloud environment data stored in cloud a long time duration any hacker can access this data [15].(ii)**Controlling the data life:** To ensure the customer that it has control over data, if it remove or delete data vendor cannot regain this data. In cloud IAAS and PAAS models virtual machine are used that process and then media wiped but still there is no surety that next user cannot get that data [16].(iii)**Back-up is not guaranteed:** There is no surety of availability and back up of data in this environment. In business backup is one of the important consideration [17].(iv)**Auditing:** To implement internal monitoring control CSP need external audit mechanism .But still cloud fails to provide auditing of the transaction without effecting integrity [18].Presently there are many solutions for measuring security and help in protecting the sensitive data in cloud.

#### Cloud Computing in Higher Education

Cloud solutions can be used to support cooperative learning and socially oriented theories of learning, using computer technologies to support collaborative methods of instruction [19]. Cloud computing offers many benefits to e-learning solutions by providing the infrastructure, platform and educational services directly through cloud providers and by using virtualization, centralized data storage and facilities for data access monitoring [20]. Hence the benefits of Cloud computing has been utilized by the universities. At the organization level, Cloud Computing may be considered an extension of SOA (Service Oriented Architecture) [21]. The potential and efficiency of using Cloud Computing in higher education has been recognized by many universities among which we mention University of California, Washington State University's School of Electrical Engineering and Computer Science, higher education institutions from UK, Africa [28], U.S and others.

Thinking, planning, and working in the cloud requires universities to cope with specific challenges of cloud environment [22] such as uncertain definitions, privacy, contractual and jurisdictional issues, risk and nonperformance, interoperability,

<http://www.ijesrt.com>

network capacity, re-architecting, staff and perceptions. Also, the adoption of cloud architecture involves overcoming barriers, such as: policy and control issues, new services that will move above campus before older self-operated services, using an "accidental strategy" formed around consumer choice [23], organizational culture and regulatory considerations [24].

Figure-6: Benefit of Cloud to College



Source:

<http://blogs.technet.com/b/ptsblog/archive/2011/08/07/mobile-computing-in-education.aspx>

Cloud Computing offers to universities the possibility of concentrating more on teaching and research activities rather than on complex IT configuration and software systems [25], through a fast IT implementation. As quotes Tout et al., 2009 too complexity can be reduced with Cloud Computing. Presently, there are many practices and examples regarding the use of cloud computing such as in Commonwealth, many colleges and universities had collaborated at the formation of Virginia Virtual Computing Lab [26]. These institutions have to cut down IT expenses (by reducing the necessities of licensing and software updating) and maintain its own data centers to improve IT resources for researches and students. By including the cloud services, North Carolina State University achieved a substantially decreasing of expenses with software licensing and at the same time to reduce the campus IT staff from 15 to 3 employees with full working schedule [26]. Another example is Kuali Ready [27]

After this literature review provides the context from the challenges, application and services aspect of cloud computing, this paper also focuses on

the educational usage of the cloud services and how it will support these virtual services in a secure manner in an educational institute. We will also look for the answers of its benefits and changes it has brought to higher education institutions and different educational uses. Based on the literature review and analysis of the current cloud computing service provisions and their applications in institutions, we have also tried to introduce cloud computing to educators and help them to gain a better understanding about the conception of cloud technology and its affect on teaching and learning in institutions

### Objectives of study

1. The challenges which resulted in adopting Cloud Computing in the university.
2. The benefits after adopting Cloud Technology in the University.
3. Security Issues that needs to be rectified by adopting the technology.
4. The changes it brought by providing a solution to the present which is future-ready

### Hypothesis of study

1. There is no reduction of cost saving by Cloud Computing.
2. Cloud Computing is a secure technology.
3. There is no effect in teaching after use of Cloud Computing.

### Research methodology

Our research methodology included four main components-a literature research, web based quantitative survey, qualitative interview and case study.

### The literature review

The Literature Review informed us about the concept of Cloud computing ,benefits of Cloud computing,Challenges involved and Security issues related to Cloud Computing. *The literature review was collected from* academic research articles ,blog posts ,essayistic commentary and journals.

### Quantitative Analysis

The quantitative survey was done by sending questionnaire to 40 faculty and 80 students from all the eight learning centers of the university from and 15 IT specialists from in and out of the University. The questionnaire was based on our objectives. It

included questions on knowledge of cloud Computing, Benefits of Cloud Computing, challenges faced during change, the security issues and the changes brought by the technology.

### Qualitative Interview

The interview was taken of the IT engineers and Leaders regarding the benefits of Cloud Computing for education purpose in Higher Education regarding the Security Issues involved and Strategy undertaken to handle them.

### Case Study

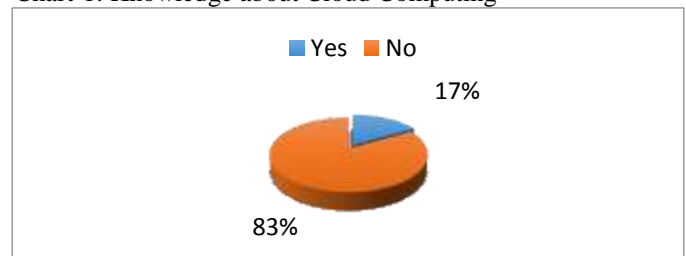
Case Study of Al-Medinah International University was taken which stands up for implementing the latest Cloud Computing Technology by taking help of Microsoft 365 and Google Apps .The problem of University was identified by video footage of Microsoft and interviews of IT specialists and by sending of Questionnaires by mail to the faculties and students for survey .

### Analysis of Variables

*Questionnaire on general knowledge about Cloud Computing*

#### Q1.Do you know about Cloud Computing?

Chart-1: Knowledge about Cloud Computing

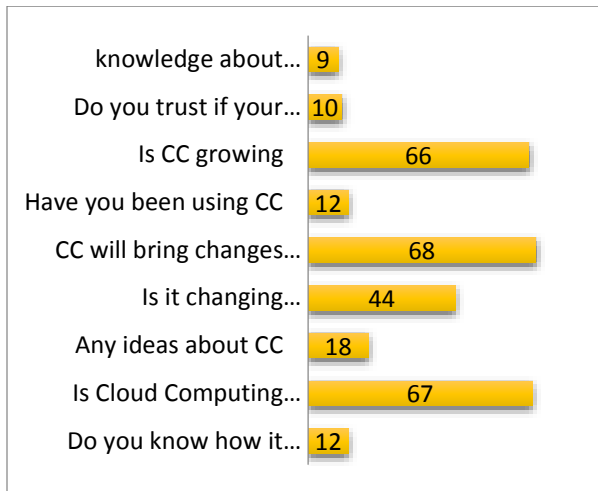


#### Sources: Compiled from collected data

**Interpretation:** It was found from the survey that 83% did not have knowledge about Cloud Computing and only 17% knew about it.

#### Q2.What is your view regarding Cloud Computing?

Chart-2 Views regarding Cloud Computing



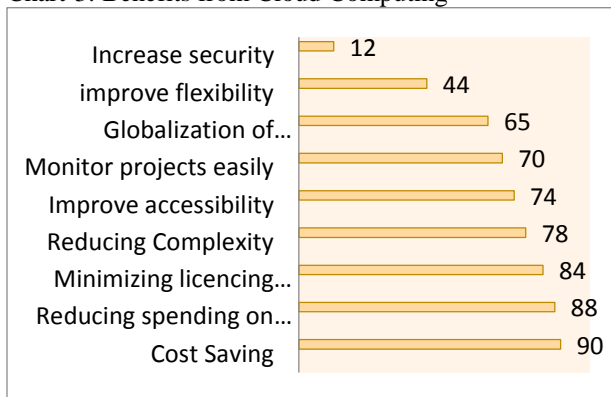
**Sources: Compiled from collected data**

Interpretation-The analysis from survey reveals 68% respondents responded that Cloud Computing is sure to bring changes in IT.67% responded that Cloud Computing is useful for education.44% responded that it will change the traditional teaching methods.18% responded as that they knew about Cloud computing.12% responded knowing about it and using it in the university.

**Benefits of Cloud Computing**

**Q3. What benefits do you derive from Cloud Computing**

Chart-3: Benefits from Cloud Computing



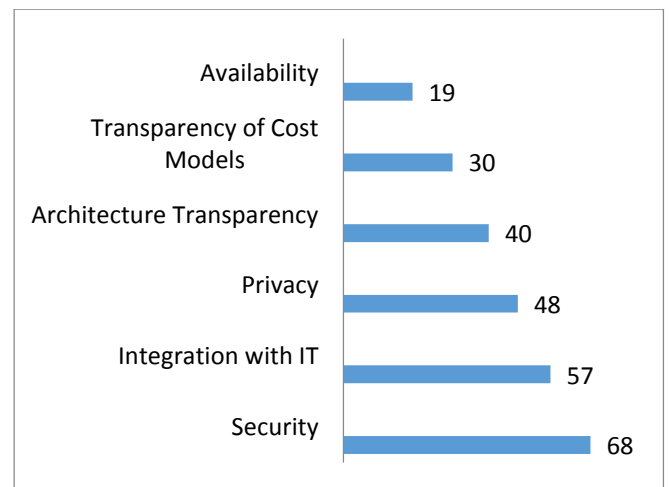
**Sources: Compiled from collected data**

**Interpretation:** After analysis of data from the survey we came to know that the Cloud Computing has major benefits of 90% Saving the cost , 88% of respondents have responded that there is reduction in spending on technology,84% believe it helps in

minimizing licensing on new software ,78% of respondents say it is reducing complexity in technology,74% say it is improving in accessibility,70% responded it helps in monitoring projects easily,65% of the respondents think it helps in globalization of workforce,44% respondents say it helps in improving flexibility and only 12% respondents think that Cloud Computing is Secure.

**Q4. What aspects of cloud computing should be improved?**

Chart-4: Improvement in Cloud Computing



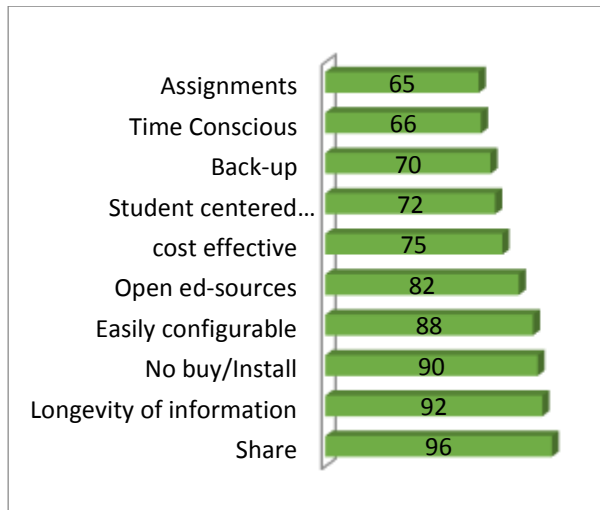
**Sources: Compiled from collected data**

**Interpretation:** It was found from the survey of data that 68% of the respondents thought that security was the main issue to be dealt with in Cloud Computing .57% of respondents said CC it needed to be integrated with IT, 48% thought the Privacy Issues should be improved, 40% of the respondents said the architecture transparency needs improvement in CC, 30% said there should be transparency of cost models and remaining 19% responded that cloud Computing should be available.

**Q5. How learning by Cloud Computing will bring changes in life of student and Educators?**

Chart-5: Changes brought by learning





Sources: Compiled from collected data

**Interpretation:** After analysis of data from survey we came to know that 96% responded that CC helped in sharing of data, 90% responded that there is no need to buy or install, 92% thought there was longevity of information, 88% response that it was easily configurable, 82% responded there was open ed-sources, 75% response agreed that the Cloud Computing service was cost effective, 72% response was that the service will have student centered education system and 70 % responses were that it is an easy back-up with no need to carry devices around, 66% think it saves time and resources printing or copying lengthy documents or lesson plan. 65% think that assignments in Cloud allows teachers to post assignments online. Students are able to access these assignments, complete them, and save them in a folder to be reviewed later.

#### Qualitative Analysis of Interview

Telephonic Interview done on the IT leaders reveals the benefits provided by the Cloud Computing at University. According to them Cloud Computing has helped the University in many aspects. We have tried to cover them in points -

1. Reduction of IT cost by avoiding hardware and consulting service.
2. Improved Reliability by giving all in one solutions from Microsoft
3. Easy scalability by power of cloud.
4. Providing single and secure solution by Microsoft 365 that helped the team collaborate and work from anywhere.
5. Working seamlessly with the backend system running Microsoft Dynamics CRM (Customer

Relationship Management) which is a client-server application-a web based application supporting extensive web service interface, Microsoft RX(Reactive Extensions) which is an open source and Moodle LMS which is a Course Management System (CMS), known as a Learning Management System (LMS) is actually a Virtual Learning Environment (VLE). It is a free web application and the educators in University are using it for creation of effective online learning sites.

#### Testing oh hypothesis

1. There is no reduction of cost saving by Cloud Computing: In view of hypothesis 1: We found that Cloud Computing brought various benefits like-saving of cost access which was responded by 90% from our survey. Thus null hypothesis ( $H_0$ ) is rejected and alternative hypothesis ( $H_1$ ) establishes that there is reduction of cost by employing cloud computing technology.

2. *Cloud Computing is a secure technology: we found that the null hypothesis ( $H_0$ ) is rejected and alternative hypothesis ( $H_1$ ) establishes that there is 68% of the respondents thought that security was the main issue to be dealt with in Cloud Computing.*

3. There is no effect in teaching after use of Cloud Computing: We found that the null hypothesis ( $H_0$ ) is rejected and alternative hypothesis ( $H_1$ ) establishes that there is 96% responded that CC helped in sharing of data, 90% responded that there is no need to buy or install, 92% thought there was longevity of information, 88% response that it was easily configurable, 82% responded there was open ed-sources, 75% response agreed that the Cloud Computing service was cost effective, 72% response was that the service will have student centered education system and 70 % responses were that it is an easy back-up with no need to carry devices around, 66% think it saves time and resources printing or copying lengthy documents or lesson plan. 65% think that assignments in Cloud allows teachers to post assignments online. Students are able to access these assignments, complete them, and save them in a folder to be reviewed later.

#### Findings and suggestions

The paper is an attempt to use Innovation in teaching and Learning Practice by adoption of Cloud Computing Technology. We have come across the

challenges faced by adopting the cloud Computing Technology in the University which was the anywhere access of IT in limited budget with provision for secure and single solution which was provided by Microsoft 365. Some of the other challenges which still persist are securing the large amount of data being used; it is here that the instructional department should take a strategic approach to the cloud as discussed further.

We found its use in teaching and served the following purpose:

- It can be used from anywhere, support for teaching and learning, improved evaluation system and database, record events and share with students, the free software or pay per use, minimizing licensing,
- 24 hours access to infrastructure and content, opening to business environment with advanced research, organize events easily,
- Better connect with Alumni, better placement system, environment protection by using green technologies, increase in openness of students to new technologies and improved reputation of university.
- With the benefits Cloud Computing has changed the way of work. "This is a revolution," as said by Curtis Bonk, a professor of education at Indiana University and blogger on GETideas.org. She further quotes "Education doesn't have to take place with the teacher front and center and students sitting in rows.
- It can take place outside, under a tree branch, on a boat or plane, in a grocery store or while hiking, if you have an Internet connection. [29].
- This emerging technology has helped Educators and students alike in the university to share collaborate, deliver the learning content throughout the world.
- The learning material is helpful in interactive learning, free transfer of learning content, assessment, instructional support through cloud computing. The technology of cloud Computing delivers resources which are cost effective, consistent, and quite easy for distribution and updating.
- We found from the survey that with the benefits there are certain securities issues which have to be taken into consideration.
- The main options that may be taken regarding data are to maintain the sensitive

**data in the institution data centers and externalize all the data in order to obtain performance and maximum scalability with potential security risks.**

- **Some of the protections which can be done to maintain data integrity are by masking or de-identifying the data, by having firewalls to prevent systems, by encryption and key management.**
- **At the same time the risks and cost of implementation and non implementation should be taken by considering the cost.**

### Issues for risk management

After analysis of the literature review, qualitative and quantitative analysis we suggest the management to plan some of the issues on Risk Management issues for Cloud Services approaches. The Key areas for risk management are:

- Maintaining network security and securing data leakage when ever data is stored outside the internal IT architecture
- Having complete compliance to privacy and copyright laws
- Regular monitoring costs of cloud services are important in a "pay-per-use" model as costs can quickly escalate with increase of use.

There are also risks when the institute's employees and students work may be hampered in the absence of Cloud service or network connection to the service fails

### Future scope for research on cloud computing

We have seen the benefits of Cloud computing in institutions can reduce high expenditures on hardware, software and in the IT maintenance. Cloud computing also provides businesses with a centralized, virtual data center which can be assessed by the faculty and admissions personnel at anytime from anywhere. Be able to store large amounts of sensitive data and information which is easily accessible and stay current by providing students with digital campus storage for class notes, papers and projects, acquiring and implementing the latest software and application updates, streamlining enrollment and admissions processes which are costly and time-consuming. As every change has its pros and cons so have Cloud Computing hence for

the future the following questions need to be answered:

1. *The security threats in Cloud Computing.*
2. *The vulnerabilities of Cloud Computing.*
3. *The legalities and policies for running educational operation on the cloud.*
4. *Who is in control of data in the cloud?*

As Cloud Computing is here to stay, in small business, enterprises, online universities and elite universities, there is a need to explore more.

### Conclusion

"Cloud computing" has arisen as the in-trend description for the great collection of a wide variety of IT services delivered through a fast digital networks similarly like a power generation and the electrical grid of a public utility. By cloud computing in colleges and universities, the recent growth is permeating with a very high speed of digital networks is offering access to more efficient computing and an opportunity for rethink about the approaches for delivering IT services. These networks are acting as catalysts that point toward an evolving innovative service in the field of education. It is an opportunity for institutions — to garner the anticipated economic benefits of cloud computing models, the efficiencies are especially welcome as it is beneficial for sharing, collaboration, transferring of materials and resources freely over the cloud thus moving towards a more future oriented paperless world.

Surging forward at the speed, information technology is being delivered as a service and with efficiencies in IT aggregation by development of new models for aggregating above-campus IT services models. These models are further driven by sound economics and high-speed digital networks. The Educators should embrace the opportunity presented by the perfect storm of all challenge with the rapid innovation in cloud computing models with the higher education's continuous desire toward the greater possibilities.

The contribution in higher education thus proves through this article and elsewhere that we can invest our efforts for creating and sustaining achievements beyond one learning centre alone. These new solutions thus represent a step forward by moving with empowered vision of one vast university spread across the world. Above-campus IT service offerings empowers faculty and students in customizing remixing, and reusing information. It serves for their local needs and provides access to the latest tools and services developed that higher education has to offer.

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As there is a change in the conventional way of Computing, the future of Cloud computing is quite promising. As per the survey conducted it is estimated to be 70% used in America for business and personal use. We are presently witnessing the use of cloud computing by using e-mails and social – networking by smart phones and mobiles and uploading pictures from Flickr and watching videos in mobiles. Cloud computing has already affected our life in many ways and will affect in the future. Appropriate leadership can help to shape use of cloud computing in Higher Education now and into the future thus moving towards -‘one university into one world’.

### Definitions of terms

1. *Virtualization: a framework or methodology of dividing the resources of a computer into multiple execution environments, by applying one or more concepts or technologies such as hardware and software partitioning, time-sharing, partial or complete machine simulation, emulation, quality of service, and many others. It allows abstraction and isolation of lower-level functionalities and underlying hardware. This enables portability of higher-level functions and sharing and/or aggregation of the physical resources*
2. *Microsoft Dynamics CRM (Customer Relationship Management) is a client-server application-a web based application supporting extensive web service interface.*
3. *Microsoft RX (Reactive Extensions) The Reactive Extensions (Rx) is a library for composing asynchronous and event-based programs using observable sequences and LINQ-style query operators.*
4. *Moodle LMS which is a Course Management System (CMS), known as a Learning Management System (LMS) is actually a Virtual Learning Environment (VLE). It is a free web application and the t educators in University are using it for creation of effective online learning sites.*

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