INTERNATIONAL JOURNAL OF RESEARCH CULTURE SOCIETY ISSN: 2456-6683 Volume - 4, Issue - 4, Apr – 2020
Monthly, Peer-Reviewed, Refereed, Indexed Journal Scientific Journal Impact Factor: 5.245
Received on : 28/03/2020 Accepted on : 11/04/2020 Publication Date: 30/04/2020

A study on extent of cloud computing in education

Dr. Tejas Thakkar
Assistant Professor
Natubhai V. Patel College of Pure and Applied Science, Vallabh Vidyanagar, Gujarat, India

Abstract: *The cloud computing is an unexpectedly creating technology, which has delivered big modifications and possibilities to a range of zone in India. It is a pervasive computing paradigm that has revolutionized how Information Technology infrastructure and offerings can be delivered. There is a developing hobby round the utilization of cloud computing in the training sector. Present find out about is a try to furnish an overview of the cloud computing mannequin and its purposes for collaboration between academia and student. In this paper we proposed cloud computing to e-learning from the following aspects: its work mode, services, advantages and issues. This paper is an analytical learns about on the function of cloud computing in training with reference to administration institutions. Primary find out about used to be carried out with foremost stakeholders of technical training infrastructures which are applied for educational use. The nation of the artwork on the use and lookup of cloud computing in training was once performed via qualitative methodology. After a complete evaluation of the on hand literature, approx. eight lookup works have been recognized and mentioned to spotlight the significance and likely utilization of cloud in the training domain. The survey identifies and analyses the benefits and dangers that the use of cloud computing can also have for the most important stakeholders in education. The vast evaluation suggests that the introduction of cloud computing to administration schooling is possible to carry higher readability panorama about its benefits.*

Key Words: *Cloud Computing, Cloud Computing & Learning as a Service (LaaS), Software as a Service (SaaS), Virtual Computing Lab (VCL), Distributed gaining knowledge of environments, Interactive getting to know environments.*

1. INTRODUCTION:

In current years e-learning equipment show up to be developing and are turning into broadly popular as a getting to know approach (Ewuzie & Usoro, 2012). In the ultimate couple of years "cloud computing" has more and more been mentioned in the a number boards (Krelja Kurelovic E. Rako S. & Tomljanovic J. 2013). Cloud computing is now not a totally new idea however a aggregate of new and current technologies. The cloud computing is additionally a disruptive and evolving technology, which brings computing power, massive storage, functions and offerings to person by way of Internet. This new computing fashion focuses on customers' requirements, and additionally pushed with the aid of the growing use of a number of cell units such as Laptops, Tablets and Smartphone's. The cloud computing has many blessings with some limitations, each springing up from the truth that all information and purposes are positioned on the Internet. Since the facts saved and functions on cloud can be get admission to actual time and online. It can be used in more than a few things to do of daily life, inclusive of in education. Cloud computing is a mannequin for enabling convenient, on-demand community get right of entry to to the shared pool of sources (e.g. servers, storage, purposes and services), which can be swiftly provisioned and launched with minimal administration efforts. As per the cloud mannequin tailored and the utilization of it are the foundation for chargeable industrial value.

For formal and casual education, many functions and offerings on the cloud the get entry to can be supplied to college students and teachers. The cloud computing lets in for increased flexibility and mobility in the use of sources for educating and getting to know with higher diploma of collaboration, conversation and sharing of resources. It additionally creates a customized studying surroundings or digital communities of educating and learning.

1.1. REVIEW OF CLOUD SERVICE MODELS:

The cloud computing has foremost deployment fashions such as Private, Public and Hybrid, however has an extraordinary traits such as Client-Server Model, Grid Computing, Fog Computing, peer-to-peer computing. All the cloud deployment fashions provide extraordinary offerings such as Infrastructure as a carrier (IaaS), Platform as a provider (PaaS) and Software as a provider (SaaS) (Alshuwaier & Areshe, 2012).

1.2. Infrastructure as a Service (IaaS): In this cloud carrier mannequin the provider issuer hosts all the required indispensable hardware and the Internet connectivity link. The user only share accountability for the digital computing device hosted on this hardware and the software's(include working system) which runs on it. As proven in discern 1, this is the closing / backside layer and the software program functions run on it. This provider gives on demand infrastructure which is storage, computing, networking, administration and guide factors (virtual servers). This infrastructure is accessed by Internet, enabling companies to cross their records to cloud. Resulting in to dissolve or

dismantling there in residence information centers. Each of these offerings can be deployed by means of companies or humans both as a private, public, hybrid and neighborhood cloud

Source: https://www.edureka.co/blog/cloud-computing-services-types

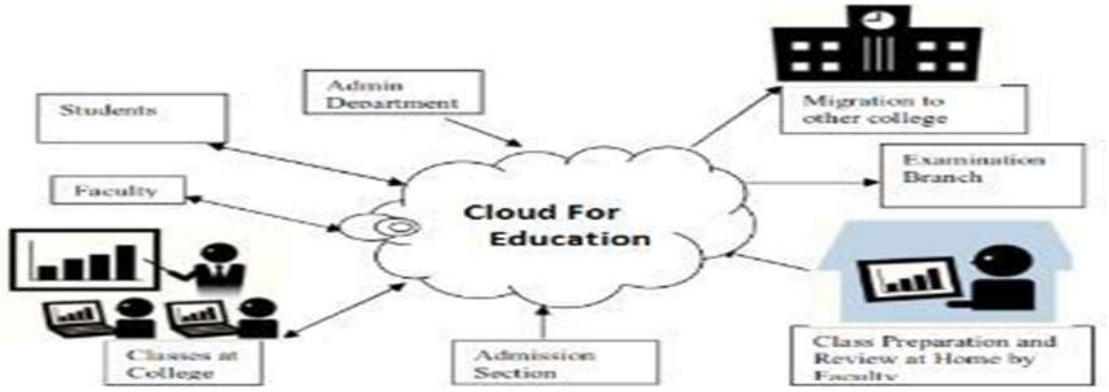
Figure 1. Cloud Service Models

1.3. Infrastructure as a Service (IaaS): In this cloud carrier mannequin the provider issuer hosts all the required indispensable hardware and the Internet connectivity link. The user only share accountability for the digital computing device hosted on this hardware and the software's(include working system) which runs on it. As proven in discern 1, this is the closing / backside layer and the software program functions run on it. This provider gives on demand infrastructure which is storage, computing, networking, administration and guide factors (virtual servers). This infrastructure is accessed by Internet, enabling companies to cross their records to cloud. Resulting in to dissolve or dismantling there in residence information centers. Each of these offerings can be deployed by means of companies or humans both as a private, public, hybrid and neighborhood cloud.

1.4. Platform as a Service (PaaS): In this cloud provider mannequin the consumer components the software they desire to deploy and the cloud carrier issuer elements all the elements required to run this utility which is additionally referred to as an utility hosting. As proven in the parent 1, this is the center layer between SaaS and IaaS. It presents working systems and software improvement platform which can be accessed and utilized with the aid of the Internet. Developers use this platform to develop, test, install and host net functions as a provider through the internet. E.g. vendors of such structures as a carrier are Google Application Engine, Microsoft Windows Azure and International Business Machine (IBM).

1.5. Software as a Service (SaaS): In this cloud provider mannequin the provider issuer components the software program software and all the aspects required for its execution. SaaS is designed to be a turnkey answer for the customers. Many web-ERP software program options are hosted on the SaaS cloud and supply accounting and commercial enterprise Information to the consumer or customer. As proven in the determine 1, this is the top-most layer of cloud computing. This layer includes purposes such as textual content processors, video editors and databases to be hosted by using cloud carrier company and is made easily handy to the customers on demand by way of Internet. Few examples of software program as a provider consists of client relation administration (CRM), e-mail messaging, Google Document (Doc) etc. (Alshuwaier, Alshwaier, & Areshey, 2012)

Community cloud: It is completely for a set of customers inside closed team having a frequent goal. Many Universities / Institutes provide entire on-line training applications the usage of hybrid cloud model.



Source: https://www.researchgate.net/figure/Figure2-Cloud-Computing-in-Higher-Education-systems

Figure 2. Cloud for education

These Universities / Institutes put into effect cloud-based options for their IT infrastructure. The predominant use of cloud-sourcing is for E-mail, calendaring, collaboration, videoconferencing, ERP (enterprise useful resource planning) and learning management systems. Outsourcing the provision of gaining knowledge of administration options (LMSs) such as Blackboard or Moodle to a 0.33 celebration makes experience for establishments to who can't justify the charges of purchasing, keeping and helping the hardware and software program themselves. Such LMSs answer presents collaboration between academia and students. The e-learning cannot completely supplant educators; it is simply a redesigning for innovation, thoughts and instruments, giving new substance, thoughts and strategies for instruction, so the components of instructors cannot be supplanted (Ishaq & Brohi, 2015).

2. ROLE OF CLOUD IN EDUCATION:

The administrator, a teacher, a student, or the parents, now have a great time to explore how cloud-based applications can benefit Students and Institute or University (Kaur & Singh, 2015).

Benefits	Description
Less expensive or subscription based textbooks	The post graduate level textbooks are expensive and have less number of copies in library. Cloud-based textbooks can solve this problem by converting them in to digital content format, which are less expensive than printed. This will help the lower-income group students to have access to quality learning materials.
No more outdated learning materials	Many times, the expensive printed textbooks which students are using from library are outdated. Also due to financial concerns or budget provisions, replacement of these outdated resources becomes an issue. In Cloud- based materials are easy to update on real time basis, so that students get access to the latest learning resources.
Less hardware expenses	Cloud-based applications runs on Internet browsers and they are also compatible with the mobile devices. This means that learner does not necessarily need to own an expensive computers / laptop, a Smartphone or Tablet can access these applications. Learner doesn't need to buy any storage devices, as the data can be stored on to cloud like Google Drive.
No expensive software required	One of the biggest advantages of cloud computing is the SaaS model (software-as-a-service). Many software applications based on Android based devices are now available either free or on a low-cost subscription basis.
Students reach	Cloud computing has opened a world of new possibilities for learner and academia. Now the learner can earn their diploma via opting online instruction medium. There are many other types of students for whom a traditional school environment simply doesn't work, and cloud computing has provided alternate to these students.
Environment	Cloud computing not only reduce costs, but also create an environment where all learner have access to high- quality education resources. Such online cloud based environment creates collaboration amongst academia and student or learner.

But since the Internet is a public media or network with little regulation, it also leads to some issues. But as more and more information is being placed on the cloud, concerns are beginning to grow about just how safe an environment it is? (Viswanath MD Kusuma & Gupta, 2012).

Issue	Description
Security	The customer argument that the data is more secure when managed internally on local hard-disk or LAN storage. Also the location of data storage is unknown in the cloud environment.
Privacy	Unlike traditional computing model, the cloud computing utilizes the virtual computing technology where user data may be scattered at various virtual data centers, which might be located geographically at different location. Where there could be controversy in data privacy protection in the location legal systems.
Reliability	In cloud computing servers also experience downtimes and Slow downs and users have a higher or complete dependent on cloud service provider (CSP).
CSP Locked-in	In the CSP's service model, once the selection of a particular CSP is done, the data is uploaded on to CSPs Infrastructure. Which brings locked-in, thus bring a potential business risk.
Attacks, Hacking, Theft	Hackers can invade virtually in to any server, and the statistics show that one-third of breaches result from stolen or lost devices. The other reason is from employees'

	accidentally exposing data on the Internet. Attackers have ability to analyze the critical task submitted by the users on the cloud.
Open Standard and APIs	The open standards are critical to the growth of cloud computing. Most cloud service providers expose APIs which are unique to their implementations and are not interoperable.
Compliance	The regulations to the storage and use of the data require regular reporting and audit trails, cloud service providers must enable their customers to comply with these regulations. In addition the data centers maintained by the cloud service providers are also be the subject to compliance requirements.
Long-term Viability	User should develop some mechanism to ensure that the data they put into the cloud will never become invalid even if cloud provider shuts or get acquired by other company.

2.1. SOLUTION:

As the development in cloud computing, the person community must take proactive measures to make sure safety by way of the statistics encryption. Also want to take a look at CSP vendor's readiness for security certifications and exterior audits, identity management, get right of entry to control, reporting of security incidents, personnel. The consumer neighborhood want to ship and keep decrease private statistics in the cloud. Clouds Service Provider has to allow and maximize the consumer manipulate and provide feedback.

2.2. DATA ANALYSIS AND INTERPRATATION:

The information accrued for this lookup has been from each major and secondary source. The principal supply records have been accrued the use of questionnaires, whilst the secondary source records have been gathered from educational Journals, publications, the Internet and literature based totally on cloud computing (Awosan 2014).

Table 1: Type of organization

Experience Organization type offers education	No of Colleges	%
Degree Colleges	56	60.87
Post Graduate Colleges	31	33.70
University (Distance Mode)	5	5.43

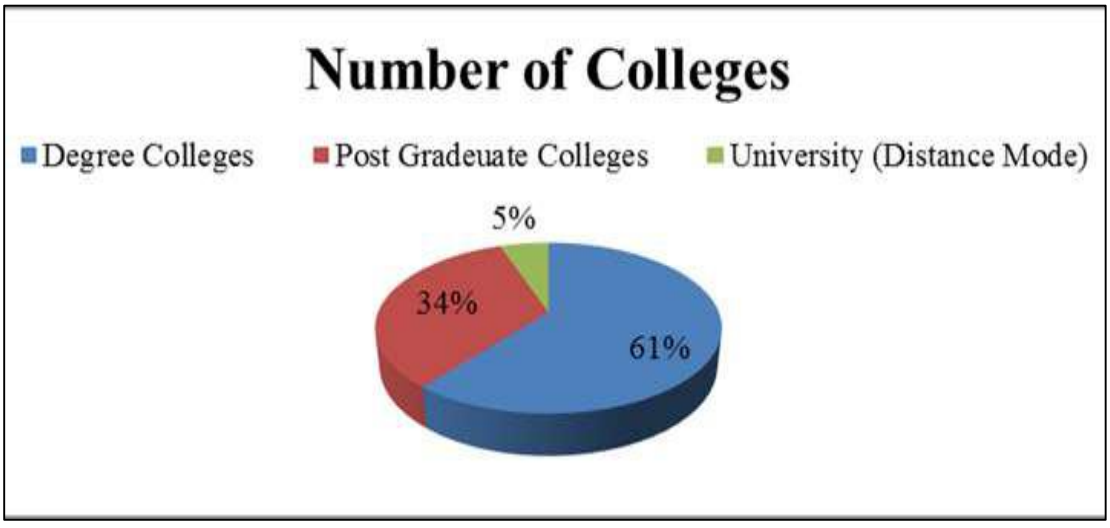


Figure 3: Number of Colleges

Table 2: Media of study material distribution to students		
Media	Count	%
Text Books, Printed Notes	23	19.17
eBooks	27	22.50
CDs	10	8.33
Depends on Teacher / Faculty	56	46.67
None	4	3.33

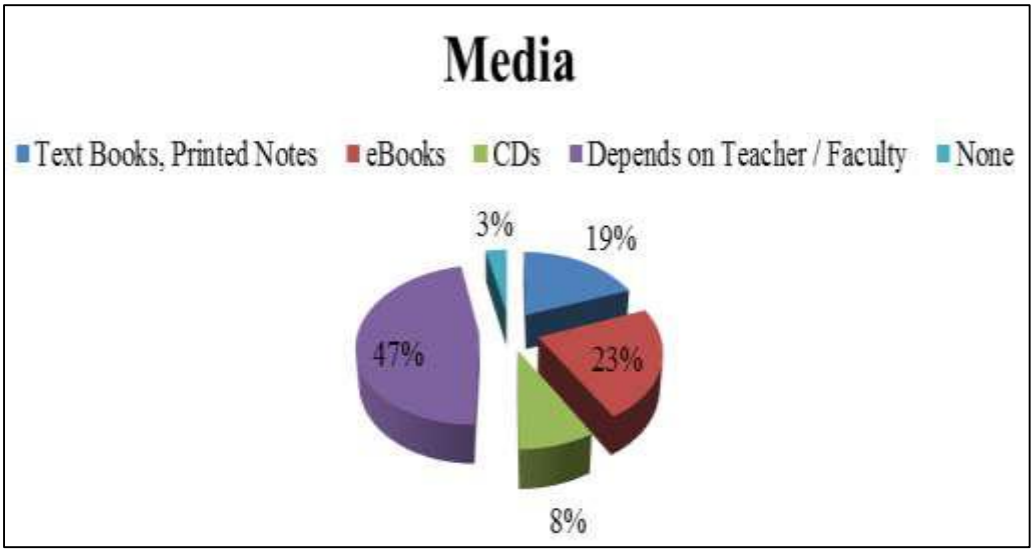


Figure 4: Media of study material distribution to students

Table 3: Mode for course / subject lecture delivery

Course Delivery Mode	Count	%
Personal Contact Programs (Periodic in year)	11	9.17
Virtual Class Rooms / Video Conference	24	20.00
Course based Video Lectures	13	10.83
Traditional Class Room Teaching	68	56.67
None	4	3.33

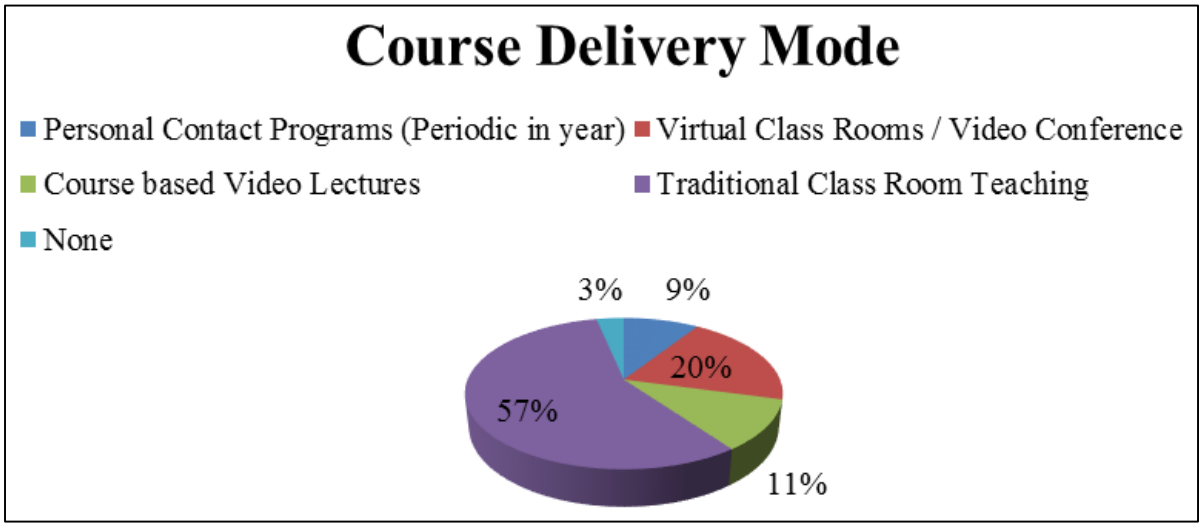


Figure 5: Mode for course / subject lecture delivery

Table 4: Awareness of Internet / cloud computing

Experience	Not aware	Somewhat aware	Total Aware
Awareness of Internet / Cloud Computing	8 (8.70%)	19 (20.65%)	65(70.65%)

Table 5: Website for content delivery

Website Hosting Mode	Count	%
In-House	12	13.04
Out-Sourced	28	30.43
Web-sites (No knowledge about hosting location)	47	51.09
No	5	5.43

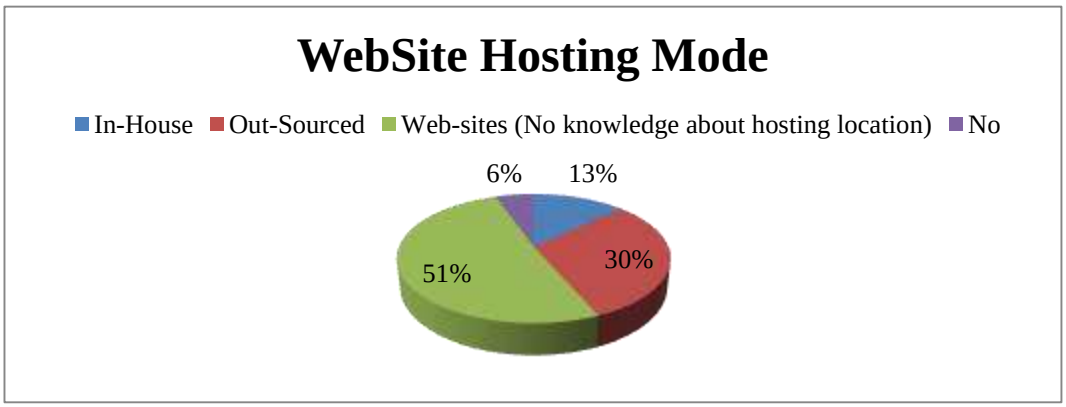


Figure 6: Website for content delivery

Table 6: What Cloud / Internet based services your Institute has adopted?		
Internet / Cloud based services	Count	%
CRM, ERP, any Web Application	7	5.83
Web based email like gmail, hotmail etc.	45	37.50
Google Docs / Groups (Students Collaboration)	26	21.67
Video Dictionary of Lectures	6	5.00
Storage for Data Sharing	24	20.00
Online Library for ebooks, article, white papers	12	10.00

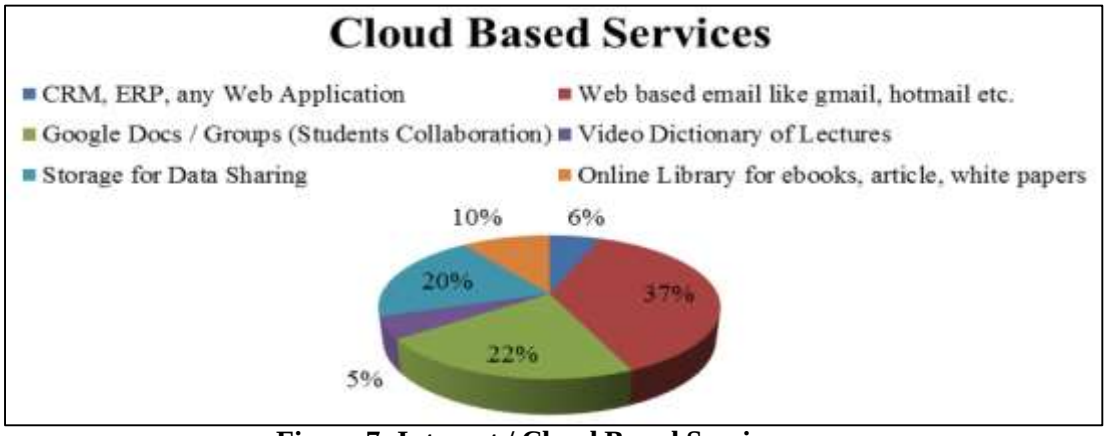


Figure 7: Internet / Cloud Based Services

Table 7: Will cloud computing play major role in the collaboration at your Institute?

Role of Cloud Computing	Count	%
Yes	28	30.43
No	11	11.96
Never thought about it	45	48.91
Neutral	8	8.70

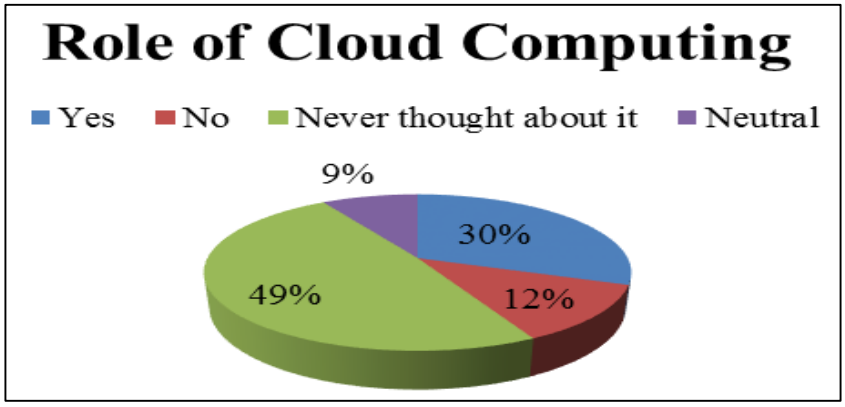


Figure 8: Role of Cloud Computing

Table 8: Do you find cloud computing is insecure medium / environment(Trust Factor)

Cloud Computing insecure Medium / Environment	Count	%
Strongly Agree	14	15.22
Somewhat Agree	48	52.17
Disagree	5	5.43
Neutral	25	27.17

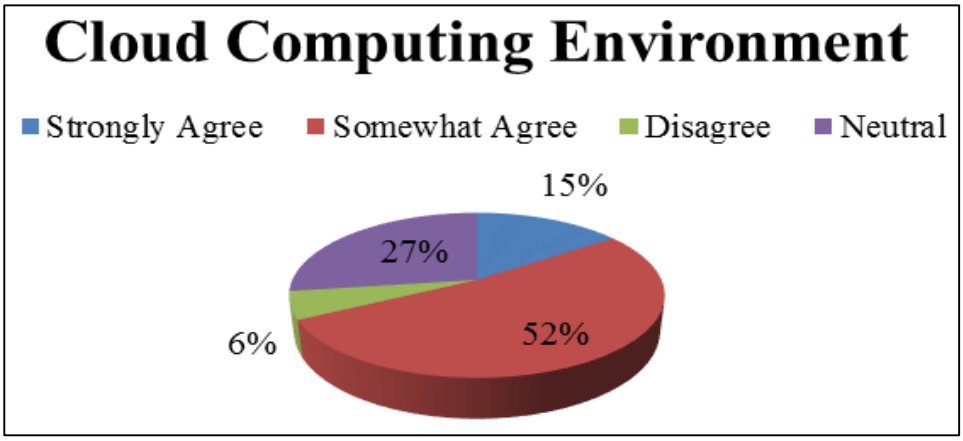


Figure 9: Cloud Computing Environment

Table 9: factor might affect the adoption of cloud computing

Factor affect the adoption of Cloud Computing	Count	%
Internet Bandwidth	24	20.00
Staff Motivation	42	35.00
Budgets, College / Institute Policy	22	18.33
Vendor Support	9	7.50
Neutral	23	19.17

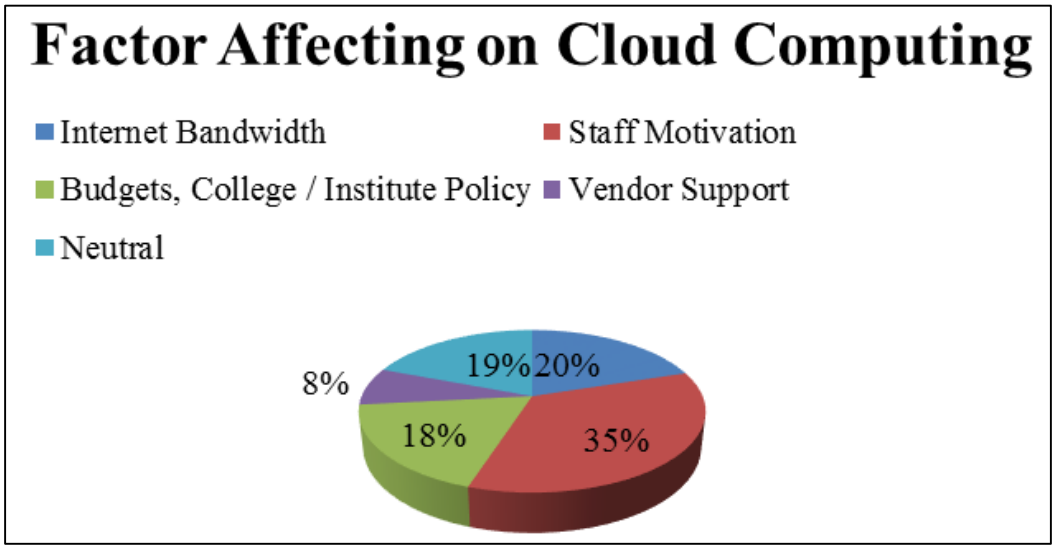


Figure 10: Factor Affecting on Cloud Computing

Table 10: factor affects the adoption of cloud computing in education

Factor affect the adoption of Cloud Computing in Education	Count	%
Security, Privacy, Reliability issue	32	26.67
Hacking, Theft, Attacks	19	15.83
Content Development	28	23.33
Laws and Regulation	5	4.17
Neutral	36	30.00

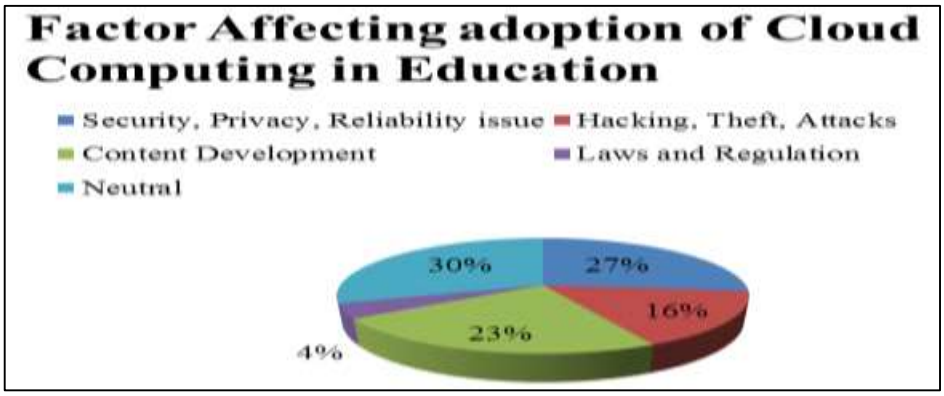


Figure 11: Factor affecting adoption of Cloud Computing in Education

3. CONCLUSION:

The cloud computing is an unexpectedly creating Internet-based computing model. With the aggregate of e-learning the usage of cloud computing and administration education, opens up new thoughts for similarly development. This paper we have mentioned a cloud computing based totally eLearning, advantages & issues. There is no doubt that the introduction of cloud computing into administration schooling is viable & brings us the about limitless computing capability, scalability, advantages to the students. The paper additionally highlights the utilization of cloud is now not enough in the degree colleges, which wishes to be improved.22.5% of the establishments furnish eBooks, which is a benefit for college students and altering environment. The 56.67% of the establishments makes use of regular type room educating technique and additionally used video convention for lecture delivery. 70.65% of the institute officers are completely conscious of Internet and cloud computing technologies. 37.50% of the responding institutes have university website, however do no longer have any mechanism for learn about fabric or content material delivery. 100% of the responding institutes use electronic mail for collaboration with regulators, college students and different stake holders. 30.43% of the responding institutes agree with that cloud computing will play most important function in the company for collaboration. From safety component 52.17% of the responding institutes agree with that cloud is fairly insecure. 35% of the responding institutes accept as true with that body of workers motivation will have an effect on their cloud adoption for administration education. Majority of the responding institutes agree with that security, privacy, reliability, hacking, theft, assaults would be the important thing which will have an effect on ordinary cloud adoption.

REFERENCES:

1. Alshuwaier, F. A., Alshwaier, A. A., & Areshey, A. M. (2012). Effective Use of Cloud Computing Services in Education. Journal of Next Generation Information Technology, 3(4).
2. Awosan, R. K. (2014). Factor Analysis of the Adoption of Cloud Computing In Nigeria. African Journal of Computing & ICT, 7, 33-42.
3. Ewuzie, I., & Usoro, A. (2012, December). Exploration of cloud computing adoption for e-learning in higher education. In Network Cloud Computing and Applications (NCCA), 2012 Second Symposium on (pp. 151-154). IEEE.
4. Gupta, N., & Thakur, S. THE FACTORS AFFECTING ADOPTION of CLOUD COMPUTING TECHNOLOGY in EDUCATION INSTITUTIONS.
5. Ishaq, A., & Brohi, M. N. CLOUD COMPUTING IN EDUCATION SECTOR WITH SECURITY AND PRIVACY ISSUE: A Proposed FRAMEWORK.
6. kasi Viswanath, M. D., Kusuma, S., & Gupta, S. K. (2012). Cloud computing issues and benefits modern education. Global Journal of Computer Science and Technology, 12(10-B).
7. Kaur, R., & Singh, S. (2015). Exploring the Benefits of Cloud Computing Paradigm in Education Sector. International Journal of Computer Applications, 115(7).
8. Krelja Kurelovic, E., Rako, S., & Tomljanovic, J. (2013, May). Cloud computing in education and student's needs. In Information & Communication Technology Electronics & Microelectronics (MIPRO), 2013 36th International Convention on (pp. 726-731). IEEE.
9. https://en.wikipedia.org/wiki/Cloud_computing
10. http://ignou.ac.in/ignou/aboutignou/school/soms/programmes/detail/58/2
11. http://distance.nmims.edu/resources.html
12. http://smude.edu.in/smude/programs/management/mba-tab-enabled.html
13. http://mu.ac.in/portal/distance-open-learning/distance-open-learning-more-info/
14. http://www.scdl.net/I-learn.aspx