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A Review Study on the Implementation of the SAAS in Educational Institutions

Ibrahim N. Abdullah
Al-Hikmah University College, Baghdad, Iraq
ibrahim.najim@hiuc.edu.iq

Abstract

In today's education, content delivery, communication and collaboration are completely associated with information technology. With its fluid scalability and usage of virtualized infrastructure as a commodity across the internet, cloud computing is becoming an suitable technology for many enterprises. The impact on the education system would certainly be significant in the future. Software as a Service (SaaS) in cloud computing allows consumers registered or paying customer access to web-based applications or resources and not on the user's device. In this paper we will examine the implementation of SaaS in the field of education and learning. With the help of the available cloud applications offered by the cloud service providers, SaaS will soon have a significant impact for the educational and learning environment and allow its users (that is to say, teachers and administrators) to effectively perform their duties at lower expenses. The potential benefits of cloud computing can be utilized by both public and private institutions to provide better service, even with fewer resources.

Keywords: *clouds, cloud computing, SaaS, cloud benefits, educational institutions*

I. INTRODUCTION

Nowadays, in the field of information technology (IT) the term 'cloud computing' is an important concept. Cloud computing is a highly scalable form of computing which uses virtualized resources that users can share. No background information of the services is required by users. A Web user will connect at the same time with other servers and they share information (Hayes, 2008). Cloud Computing is one of the latest technology developments that would potentially have a huge effect on the educational and learning world (broadband internet, quick connectivity and virtualization). A common infrastructure that provides web-based value-adding services may be defined as the use of new or existing computing hardware and virtualizing technologies. Infrastructure, platform and software as a service are the three dominant service models (Al-Shqeerat et al., 2017).

In the previous years, the US analyst Gartner has consistently identified cloud computing as one of the top ten strategic technologies and trends. In 2008, because of the success of the Software as a Service (SaaS) model, it was named 'Web Platform & web-oriented architecture' and was later named 'Cloud Computing' between 2009 and 2011. Cloud storage is the way to provide easy, on-demand access to the network to a common pool of computing resources (for example, networks, servers, storing, software and services) that can be easily distributed and published with little maintenance effort or interference between service providers.

Senior executives in their companies ask how they can restructure their IT processes in the light of different technology developments so that they can meet organizational goals. Increasing market needs are pushing conscientious IT professionals to seek new methods of redeploying their scarce domestic capital to help meet company goals. This encourages them to focus more on third-party providers to improve their internal resources and better meet their clients and strategic partners' needs.

Cloud computing has lately drawn a significant trend and interest both in academia and business, which, thanks to its simplicity and cost-per-use layout,

may give companies enormous advantages and leverage in certain cases. Cloud infrastructure is an new Internet computing model for pay-per-use on-demand Information Technology (IT) systems in the same manner as other utilities such as power, energy, and more for its integrated elasticity and scalability. The cloud storage network provides information on an on-demand basis.

Universities, and Colleges slowly expand the use of information technology for the implementation of training programs. There is a significantly growing demand for networks, computers, data, software and facilities. Investment in technology, network and applications was initiated by educational institutions. The market for computers by educational institutions continues to shift periodically. In his PDA, tablets and mobile phones the student is expected to view the information. Cloud Computing is a tool that meets the needs of education institutions. On-demand, self-service services, broad network access, pooling of resources, fast elasticity and measured service are the characteristics of cloud computing.

This research will concentrate on adoption of SaaS in classrooms. The analysis would also be delimited by secondary data within the constraints of exploratory architecture. The search for literature is the source of secondary evidence, and so the purpose of this search for literature is to investigate previous works in line with subjects in particular.

II. CLOUD COMPUTING (CC)

Cloud computing may be described as the use of modern and existing computer hardware and virtualization technology to create a common network of value-added services centered on the internet. Cloud computing can be described as a modern programming style that offers dynamically distributed and often virtualized services as a service over the Internet. Cloud computing has grown into a major technology trend, with many experts expecting that cloud computing will reshape the IT and IT processes. Users use cloud computed technology to access programs, storage and app development platforms over the internet via cloud-based services, including PCs, laptops, smartphones and PDAs. Cloud technology benefits include cost savings, high availability and easy scalability (Furht and Escalante, 2010). Cloud choices include regular resources

such as email, calendar and online communication tools. System managers can quickly bring new services and computer capabilities online while managing costs as operating costs. Cloud storage helps management handle uncertainties, rising demand and long-term planning requirements by helping IT to adapt rapidly to changes.

Three cloud computing service models exist, where the consumer does not manage or control the cloud infrastructure underlying this system, including the networking, servers, operating systems, storage or applications. The three services models include Service Infrastructure (IaaS), Service Platform (PaaS) and Service Software (SaaS) (Mell and Grance, 2011). The consumer can use IaaS to provide processing's, storage , networks and other computer resources on a demand-based basis, so that the consumer is able, including operating systems and applications, to install, run and control arbitrary software with possibly limited control over selected networking components (e. g. firewalls host) (Mell and Grance, 2011). Virtualization provides an abstraction and encapsulation of the hardware level tools that delivers a flexible infrastructure for the centralized data center, which allows end users to use a simplified interface connected to services over the Internet.

Amazon EC2 and S3 are examples of IaaS. With PaaS user-generated applications built by programming languages and software provided by the cloud provider can be deployed to the cloud infrastructure to allow the customer to manage the applications deployed and likely host the environment (Mell and Grance, 2011). It provides application services and/or runtime environments between IaaS and SaaS for cloud-based applications. It provides support for operating systems and software development environments for designing, reviewing and installing Online applications and utilities on the platform. developers are also welcomed. Examples of PaaS are Google Device Engine and Microsoft Azure. On the other hand, with SaaS, software applications from the provider are made accessible to the consumer via the slim client interface, including a web browser, with the consumer controlling the limited configuration settings of the application. SaaS is just top-level, demand-based applications. SaaS is the cloud computing layer most visible to end-users. Salesforce.com is a popular example of SaaS offers. In cloud computing, the service is divided in three layers according to its type of

service: application layer, platform layer, infrastructure layer. The three-layer levels refer to the sub-set of resources as shown in Figure 1.

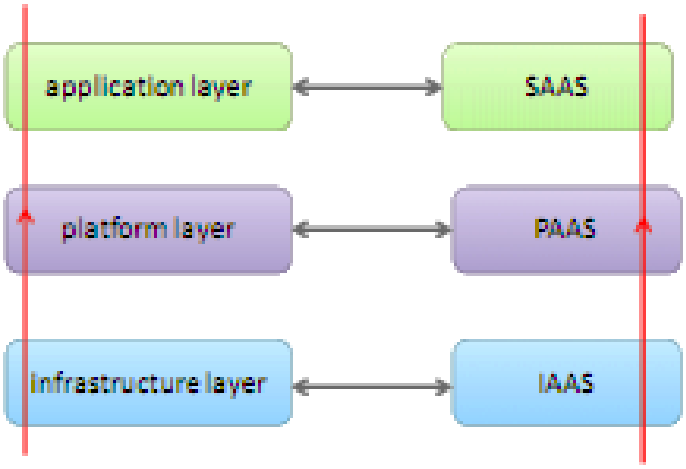

Figure 1: Layers of Cloud Computing Platform

III.

IV. SOFTWARE AS A SERVICE (SAAS)

SaaS is a distribution software model that is designed for web delivery, users can use Internet hosting and access it. SaaS Suppliers are responsible for the delivery of all post-maintenance systems and for the knowledge collection for all network technology, applications, hardware and operating platforms. SaaS not only reduces the cost of traditional software licenses and vendors deploy application software on a unified server, thereby eliminating the cost of server hardware, network security devices and software upgrade and maintenance, but customers do not need other IT investment to obtain personal computers and Internet connections. In addition , the customer does not need additional IT investment (Yang et al., 2011).

Service-as-Software provides subscribed or pay-per-use users with access to cloud-based software or services rather than to their device. The SaaS user

requires only thin customer software like a Web browser to access the cloud-hosted application. This reduces the hardware requirements for end users and makes it easier to manage, install and maintain applications unified. Hotmail, Gmail are some examples of popular SaaS applications (Lau, 2012), as well as Google Apps (Rajan and Jairath, 2011). Software as a service can have many advantages in relation to a company's cost savings and budgeting. One of the major benefits of deploying SaaS applications is the low cost of initial investment for software, hardware and personnel in a report published by Microsoft Corporation. Hurwtiz & Associates has concluded in one study that SaaS solutions saved up to 64 percent over four years, for a premise solution comparable (Amazon, 2012).

Furthermore, a SaaS solution can provide an organization with benefits in terms of data security. Balding says: "As many laptops we have to lose before we do this when we speak about lost company data (Gibson et al., 2012). The flexibility of a centralized data storage SaaS application can eliminate the need for employees to transport sensitive information when traveling. Trying to identify all possible data locations without a central location can be an impossible task that will lead to high costs and liability for enterprises. Balding also states that a centralized SaaS provider would be much easier to respond to accidents and forensics (Gibson et al., 2012). The cost of common security tests, the ability to deploy safe logging, safe buildings and a more efficient system are other benefits.

A cloud-based company can expect a lot of challenges and advantages. A thorough investigation and consideration should be undertaken to ensure the correct understanding and addressing of issues such as data safety. In the case study of SaaS, the company had many of the expected benefits, including cost savings, rapid implementation, low initial cost of capital, extended features, and a fast approach to implementation of project requirements, through the use of a SaaS data protection solution. Moreover, the educator is well positioned to cope with all data growth by selecting a SaaS solution. This particular case study provided a good example and demonstrated its potential for successfully implementing SaaS in the real world.

V. SaaS Practices in The Educational Institutions

A cloud computing company, with its budget constraints and challenges to sustainability, can only benefit enormously, but only when the organization uses cloud training that's best suited for a specific activity. In these organizations, it is necessary to classify IT activities in relation to a scheme. Classification requirements that suit the academic and educational environment must be chosen. The collection of classification criteria should be governed by two standards. Firstly, corporate cloud service providers are being clearly economized in their technology and content management capacities and provide customers with optimized and advanced offerings, regardless of the scale and sophistication of the organization, as opposed to individual education and learning organizations. This is an intrinsic concept that contributes to cloud computing. This shows that costs are not to be considered, at least in long-term planning, as a classification criterion. In addition, the benefits of moving some IT services to the cloud can outweigh the risks involved in complying with the challenges of cloud computing for educational and learning organizations. Second, business cloud providers do not understand enough educational and learning requirements at least from the perspective of education and learning organizations. This is an organizational theory, which limits the application of cloud computing to non-core business resources. The two principles are balanced and create a neutral cloud-based view.

Table 1: Example of IT Activities in the Educational institutions

Sensitivity	Mission Criticality	
	Low	*High*
High	• Sensitive Research Activities • Student Email	• Students Records • Staff Records • Faculty Records • Medical Records • Administrative (Finance, Purchasing, etc.) • Backup of Sensitive Information
Low	• Alumni Email • Student Projects • Websites for Faculty, Students, Staff, and Classes • News & Announcements • Non-sensitive Research Activities	• Faculty & Staff Email • E-learning • Mobile learning • Backup of Non-sensitive Information

VI. EDUCATIONAL USAGE OF SAAS IN CC

The Cloud supports its users/customers with computing and storage space. It functions as a demand policy service. Cloud computing is a new business model built around new technology such as virtualization, SaaS and Internet broadband. New technologies with higher computational parameters were supported by recent interests and elastic scalability. And these beneficial trends have moved not only to the outsourcing of equipment construction, but also the constant IT control of services (Open Grid Forum, 2009). The results of a 2009 survey of IT trends completed by Gartner analysts (Figure.2) show that more is utilized in finance and business than in other sectors (particularly cloud-based computing). (Gartner, 2009). Results are displayed as pie charts, with labels representing various sectors and services in each different section. The "/" is used to split the same percentage between different sectors.

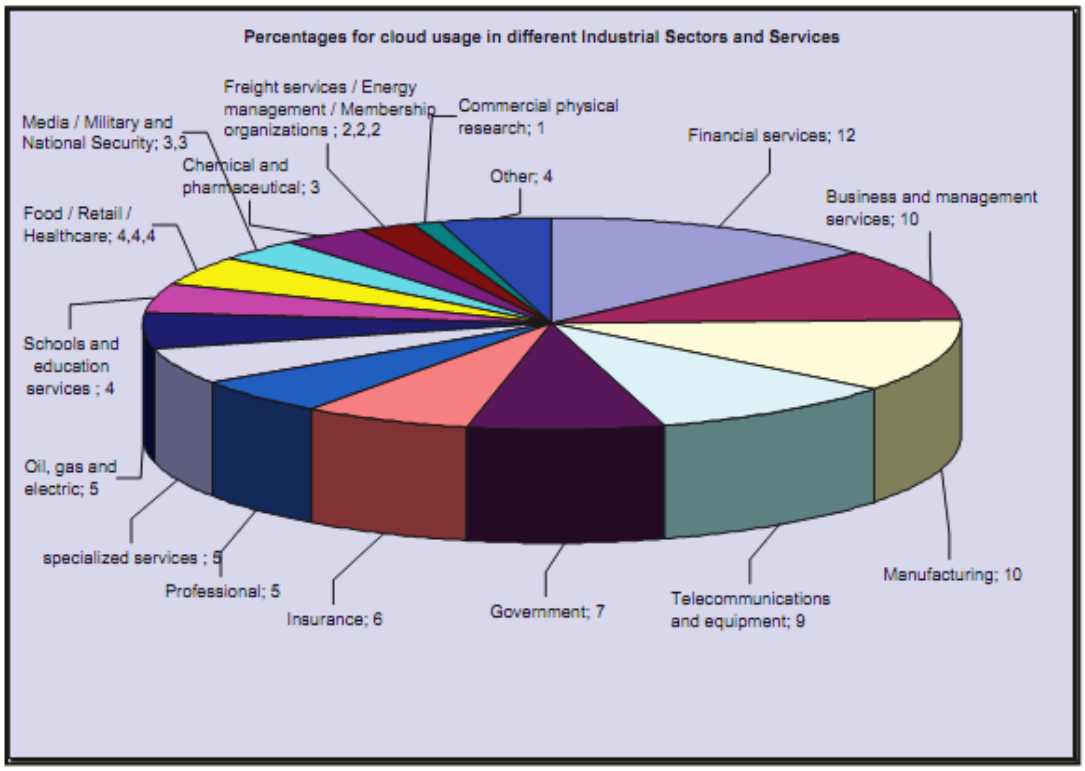

Figure 2: Cloud Usage

The institution can concentrate more on teaching and research than on complicated IT in cloud computing. Many universities have already made use of the potential and performance of cloud computing in higher education. California University, the School of Electrical Engineering, Washington State University, the United Kingdom, Africa, the United States and much more. North Carolina State University hires 15 to three full- time employees with tech certification substantially lowered and minimized the cost of the use of cloud infrastructure (Wyld, 2009). By using computer resources across campuses and incorporating automated machines on request, the university is able to offer student and staff more computer infrastructure and improved information manager facilities.

VII. LITERATURE REVIEW

In the fields of new technologies, many of the past work in the field of cloud computing, general explanations of cloud technologies, differences between similar technologies, safety requirements and future expectancy in these

emerging environments. While Banerjee (2009) Offers an overview of technological research in HP labs and attracts a cloud-based smart infrastructure, which already penetrates many of our daily live spaces in smart environments, such as Utilities, smart data centers, computer systems, automation and virtualization (Klein and Kaefer, 2008). Cloud computing is an evolving medium that seeks to exchange consumer data, calculations and services. The modeling approaches are clarified and analyzed in the context of the user interface, work management and teamwork issues (Lijun, Chan, & Tse, 2008).
Grossman et al, (2009) developed an infrastructure based on a cloud, optimally designed for broad-based applications, performance grids and the data mining applications required. The Colleges could have on-demand access to their facilities, resources and cloud computing infrastructures to speed up the implementation of various technological innovations in the academy. The cloud technology in universities was widely implemented by Praveena & Betsy (2009). Delic & Riley (2009) evaluated the current status of corporate knowledge management and how it could become a more global, reliable and effective cloud computing infrastructure. Architectural technology and related implementations are explored.

Cloud computing presents its fundamental features and compares them with the original technology of Grid Computing (Aymerich, Fenu, and Surcis, 2008). They also launched new technologies to replace a number of already available computing infrastructure. In this sense, they also expect grid computing to play a key role in deciding how cloud services are distributed. SaaS is expected to change the current system architecture of companies and is accepted as another innovation for a network company by the software deployment service providing Internet service providers (ISP) and carrier companies (Hirata et al, 2008). Service providers deliver the hardware and software products in their cloud-based software as a service (SaaS) model and interact with the user via a web portal. From web-based email to inventory control and database processing, services can range from service services (Newton, 2009).

In research and business communities the economics and elasticity of public CC infrastructure were strongly reported as essential drivers for different application domains (Khajeh-Hosseini et al., 2010). Some research studies examined the costs

of migrating software applications to the Public CC. These works do not, however, take into account elasticity dimension operating costs. It also depends on simple computing models, which are adapted for use with fixed workload patterns for individual application applications. Khajeh et al. (2010) investigated a 37% cost savings in the Amazon cloud from an IT infrastructure that decided to migrate from an outsource data centre.

Cloud offers flexibility and adaptability for the on-demand use of computer resources. Unlike only one provider, various providers use their computing resources with different architectures and customer implementation technologies. Though this creates a management problem, a common architecture makes it even easier for cloud providers to manage computer resources (Dodda, Smith & van Moorsel, 2009). Mitchell (2008) provides an overview of existing learning architecture and questions about the management of cloud computing resources by educational institutions. He also provided fair reasons for the task to index online tools to improve students and educators' discoverability.

This brief literature survey focuses on educational use of cloud services and how these virtual services are supported securely following the context of the cloud computers infrastructures, applications and services aspects. In addition, we will look at the SaaS implementation and its benefits for schools and various educational applications. In addition, we apply SaaS to educators and encourage them to develop an understanding of cloud technology development and its effect on teaching and learning in institutions based on a literature review and study of current cloud computing laws and implementations in institutions.

VIII. CONCLUSION

There are many benefits for the educational institution by providing software as a service. Education will benefit from freeing IT staff up to date and from minimal software support. The education institution will benefit. The demand for the latest technology on the campus can satisfy students ' requirements. Content sharing is just as simple as providing someone with access, which facilitates co-operation without files transfer or compatibility concerns. Cloud Services provides the

functionality available for most users who have access to their files and associated software wherever they have a computer and an Internet connection. When tandem with current single sign-on systems, cloud platforms may still work and a hardware malfunction is less of a problem. Subvention and free access for universities, collaborators, researchers and students, as well as educational institutions, can be made possible by organizations such as Microsoft, Google and Amazon.

The use of cloud structures ideally adapted for its IT operations is important for an educational and learning institution with its budget constraints and sustainability challenges. The SaaS implementation in education not only alleviates the cost of handling complex IT infrastructure management and maintenance of educational institutions, but also leads to huge economies of cost. With the universities trying to tackle the resource deficit, the cloud is one of the feasible options. Moving to the cloud, the schools can focus on their core teaching and research activities.

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