

2014

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Recommended Citation

Willett, Melanie and Solms, Rossouw Von (2014) "Cloud-based Email Adoption at Higher Education Institutions in South Africa," *Journal of International Technology and Information Management*. Vol. 23 : Iss. 2 , Article 2.

Available at: <https://scholarworks.lib.csusb.edu/jitim/vol23/iss2/2>

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Cloud-based Email Adoption at Higher Education Institutions in South Africa

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ABSTRACT

Cloud computing, in general, is having an impact on organizations today. Cloud-based email, in particular, is being adopted by educational institutions around the world on a large scale. This paper reports on the state of cloud-based email adoption at higher education institutions in South Africa; it does this by describing the findings of a survey of IT managers at sixteen of these institutions. It will show that South Africa follows the global trend of a large uptake of cloud-based email for higher education institutions. The fact that although organizations are satisfied with the service they receive from cloud-based email service providers, they have several noteworthy concerns regarding the adoption of this service. The fact that IT managers at such South African higher education institutions feel that they would benefit from the guidelines for the compliant adoption of cloud-based email is also highlighted.

INTRODUCTION

Cloud computing is a computing paradigm that is causing much interest around the world. It has the potential to allow organizations to utilize computer resources, and to access IT services more cheaply, and with less hassle than ever before (Farah, 2010; Mather, Kumaraswamy, & Latif, 2009; Shivakumar & Raju, 2010). It is however, not a computing paradigm that can always be adopted without hesitation. As with all other IT-related matters, managers are obliged to demonstrate due diligence when it comes to making decisions about the adoption of cloud computing. To be able to do this, managers should be fully aware of both the risks and the benefits associated with cloud computing. Organizations which adopt new technologies, such as cloud-based solutions, without fully investigating the risks and benefits, can put themselves at risk.

Cloud-based email is a cloud computing service, which is rapidly being adopted by organizations internationally. Educational institutions are among the foremost adopters of this cloud computing service (Corbyn, 2009). This paper examines the state of cloud-based email adoption in South African higher education institutions. Firstly, the popularity of cloud-based email at educational institutions internationally is highlighted. The state of cloud-based email adoptions in South African universities specifically is then explained by means of an analysis of the results of surveys conducted with IT staff of several South African universities.

The findings of the survey include information about which cloud-based email service providers are most popular at South African higher education institutions; how satisfied managers are with the service they receive from such providers; and what concerns such managers have with the service. To begin with though, the term cloud computing is briefly explained below.

CLOUD COMPUTING

Cloud computing is a term that has generated much discussion during the last few years. A search on Google for the term “cloud computing”, on 15 July 2010, resulted in about 49,100,000 results. The same search on 14 May 2012 resulted in about 101,000,000 results. Well-respected bodies, such as NIST (NIST, 2009), ISACA (ISACA, 2010) and ENISA (ENISA, 2010) have created groups that focus on cloud computing. Bodies devoted to the effective deployment of cloud computing, such as the Cloud Security Alliance (CSA, 2009) and the Global Inter-Cloud Technology Forum (GICTF, 2010), have also been formed. Companies, such as Microsoft, Google, Novell, Dell, Cisco, Intel, McAfee, Symantec, and many others, have subsequently become CSA members (CSA, 2009). All of these companies, therefore, have, at least indicated, their interest in cloud computing.

There are also several companies that are acting as cloud service providers (CSPs). Mather, Kumaraswamy and Latif (2009, 214) list some CSPs, including Amazon, Google, Microsoft, Salesforce.com and Sun. The investment that companies like these are willing to make, in order to enter the cloud market suggests that they believe that cloud computing will have an impact on the way organizations do business in the future. What is cloud computing though?

Fundamentally, cloud computing has to do with the provisioning of services, platforms and fundamental computing resources (infrastructure), as services over the Internet (Computer Security Alliance, 2009, 13; Mather, Kumaraswamy, & Latif, 2009, 11; Mell & Grance, 2009). Cloud computing can be simply explained by using a utility analogy (ISACA, 2009, 4, Breeding 2009). Organizations may make use of a resource, such as electricity from a utility company, without much consideration for how the electricity was produced, or where it comes from. Likewise, cloud computing makes it possible for companies to access various IT resources and services from a service provider with only an abstract idea of where the resources are and how they work.

The National Institute of Standards and Technology (NIST) defines it more comprehensively (Mell & Grance, 2009) as “a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (such as networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.”

There are a number of concerns that have been raised about organizations using cloud computing services. Some concerns associated with cloud computing found in literature include concerns regarding ensuring security, compliance to both pertinent laws, regulations and internal policies, vendor lock-in and a lack of standards and guidelines on the effective use of cloud computing in organizations.

Potential benefits that can be derived from cloud computing, such as increased flexibility, as well as scalability, greener computing and support for more business innovation, are enticing (Porta, et al., 2009, 3; Breeding, 2009). Cost reduction is another potential benefit that causes many organizations to be interested in the cloud. According to a recent KPMG survey (KPMG International Cooperative, 2011), most organizations are making use of, or are planning to make use of, various cloud-based solutions. One cloud solution that is being widely adopted in

institutions of higher education around the world is that of cloud-based email. The following subsection provides more information on this service.

CLOUD-BASED EMAIL

Email is an important service in most modern organizations. As stated by Schadler (2009), “email is an entitlement, as ubiquitous and expected as an office chair.” This is clearly shown in a report by the Radicati Group (2009), which projects that the number of email users will grow from 1.4 billion users in 2009 to 1.9 billion in 2013. In addition, the report predicts that email traffic will increase from 247 billion messages per day in 2009 to 507 billion messages per day in 2013. Email is expected to become more pervasive and play an ever-increasing role in both the personal and professional lives of employees (Bauer, 2010; Ranger, 2008; Schadler, 2009; Online social networks: Everywhere and nowhere, 2008). As email loads increase, organizations become more dependent on this means of communication.

Traditionally, organizations have provided staff with email solutions that have been implemented, maintained, managed and administered – by either internal IT staff, or by an outsourced IT company. Cloud-based email has emerged as an alternative email solution for organizations. With cloud-based email, organizations receive email services from a service provider, such as Microsoft or Google.

There is much work and considerable costs involved in maintaining an in-house email solution (Schadler, 2009). A Forrester report has revealed that firms commonly underestimate the full cost of email (Schadler, 2009). It is not surprising then, that many companies contemplate cloud-based email solutions, with their associated potential advantage of lower costs (LiveOffice, 2009).

The idea of email as a service is not new (Schadler, 2009). Email-as-a-Service or cloud-based email is one of the cloud services that some foresee will have a marked impact on organizations (Bauer 2010, Geer 2008). In a recent survey by Forrester Research, 49% of 53 large enterprises who responded to the survey, were busy evaluating an alternative option for managing and providing email (Voce, et al. 2009). This research also asserts that, “[T]here aren’t many scenarios where an organization could not benefit from hosting some of its email services in the cloud” (Voce, Schadler, Echols, & Burnes, 2009).

According to Schadler (2009), for mid-size companies, cloud-based email is often cheaper than an in-house email solutions. Google and Microsoft make cloud-based email available to schools and universities at no cost. There are other benefits associated with cloud-based email, such as the ability to rapidly provision users and to assign IT professionals to other business problems (Schadler, 2009, p. 6). Education institutions that use cloud-based email may also benefit from enhanced services. For example, users of Live@edu not only have access to 10GB mail inboxes that they can access anywhere for life, but are also provided with instant messaging capabilities and 25 GB of free online storage (Microsoft, 2010).

As alluring as cloud-based email may be, organizations still have the responsibility to ensure that email is governed and secured properly, and in such a way, that conformance is demonstrated. Cloud-based email solutions may decrease the level of control organizations have over their

email; it does not, however, decrease the responsibility (Mather, Kumaraswamy, & Latif, 2009). It is, therefore, imperative that cloud-based email solutions be properly governed, to ensure compliance and security, as both are core to good governance.

SOUTH AFRICAN HIGHER EDUCATION

Information and education are tightly related. To educate has been defined as providing someone with “training in or information on a particular subject” (Oxford Dictionaries 2010). The introduction of the South African national education information policy (2004) states that, “[T]he effective gathering, dissemination and analysis of information in the education system of any country is vital for sound education planning, monitoring and delivery.”

It is, therefore, not surprising that ICT plays an important role in higher education. Much research has been done regarding the use of ICT in Higher education (Dodds, 2007; Noirid & Srisa-ard, 2007; Zhou & Xie, 2010). One of the strategic objectives in the strategic plan 2009 – 2013 by the South African Department of Education (2009) is to support curriculum implementation through the use of ICT. One of the associated targets is to monitor and report on the access to the Internet, electronic communication and the use of ICT for administration and management of educational institutions.

From the above, the importance of email as a form of electronic communication, specifically in the higher education sector, has been highlighted.

An interesting trend is the rapid adoption of cloud-based email by higher education institutions. The next section will discuss this trend.

CLOUD-BASED EMAIL AND HIGHER EDUCATION

Cloud-based email has had a great uptake among higher education institutions around the world (Carnevale, 2008). A report by Zoe Corbyn remarks on the work published by Gartner about the hype cycle for education (2009). According to this report, cloud-based email has seen a “tremendous uptake” in higher education, and is a technology that is “firmly ensconced in the sector.” According to the NMC Horizon Report, the increased use and acceptance of cloud-based technology is one of the key trends in technology adoption between 2012 and 2017 that changes the way institutions use, configure and conceptualise certain functions (Johnson, Adams, & Cummins, 2012). This is evident when the web sites for two of the most popular providers of cloud-based services for education are examined. Microsoft (Live@edu) and Google (Google Apps for Education) both provide education institutions with free access to email and collaboration tools. Google (2011) claims to have “more than fourteen million students and teachers” using Google Apps.

Microsoft (2012) states that, “Thousands of educational institutions in more than 100 countries around the world use Live@edu services, accounting for tens of millions of users.” Some of the reputable institutions using the services provided by Google include Yale University (Carter, 2011) and Harvard College (Kumar & Weinberg, 2011).

Cloud-based email is a solution, which is readily being adopted by higher education institutions globally. Is this true in South Africa? What percentage of South African universities is using

cloud-based email? And are universities which adopt cloud-based email satisfied with the service they are receiving from the cloud-based email provider? What are some of the issues which concern university staff about cloud-based email? The following section answers these questions – by means of the results of a survey of IT managers of 16 higher education institutions in South Africa.

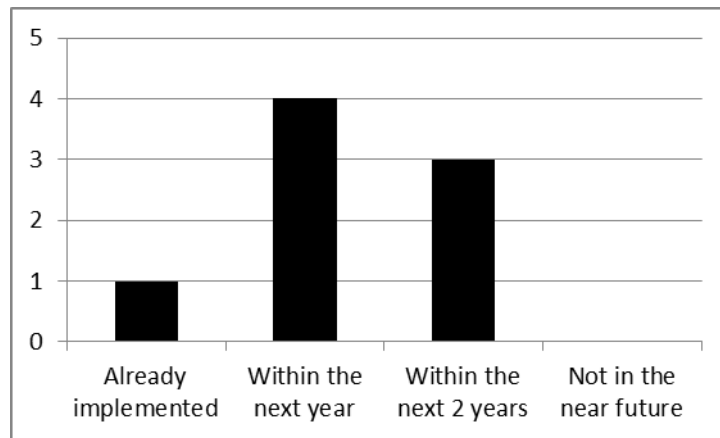
CLOUD-BASED EMAIL IN SOUTH AFRICAN UNIVERSITIES

In 2009, and again in 2012, surveys were conducted at a conference of IT managers of South African higher education institutions. In 2009, eight South African institutions responded. This year (2012), sixteen South African institutions responded. This section outlines the results of the surveys and findings of this study.

1. There is a major uptake of cloud-based email at South African higher education institutions.

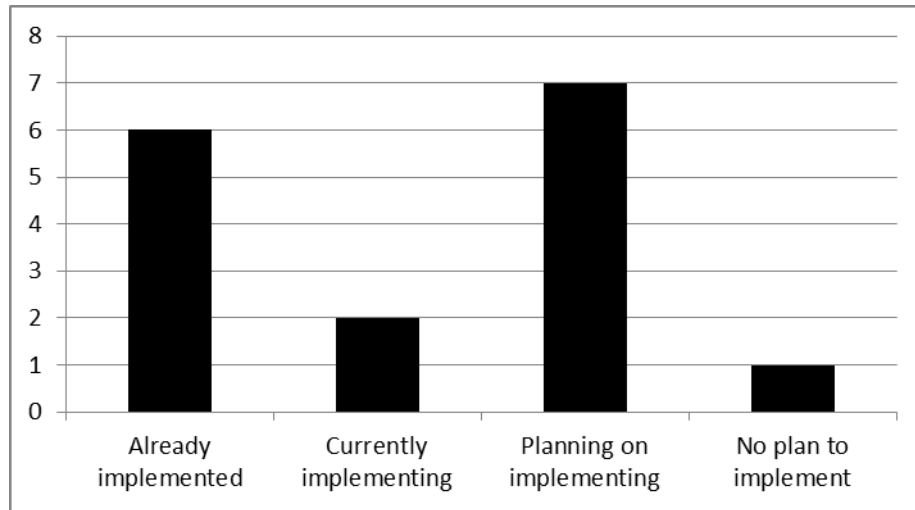
South Africa is likely to follow the global trend of a major uptake of cloud-based email by higher education institutions. In 2009, when asked about plans for using cloud-based email in the future, all those respondents, who were not already using cloud-based email, indicated the intention of implementing it within either one or two years. Figure 1 shows these results.

Figure 1: Cloud-based email adoption in South African higher education institutions in 2009.



Similarly in 2012, by far the majority of the institutions had already started using or intended to use cloud-based email at their institutions in the future. Only one institution indicated that it was not currently planning on using cloud-based email. As may be seen in Figure 2, it is noteworthy that half of the respondents had already started using, or were currently implementing, cloud-based email. Three out of the seven institutors, which were planning on using cloud-based email, were aiming to do so within the course of this year. It is expected, therefore, that soon most South African higher education institutions will be using cloud-based email in some form.

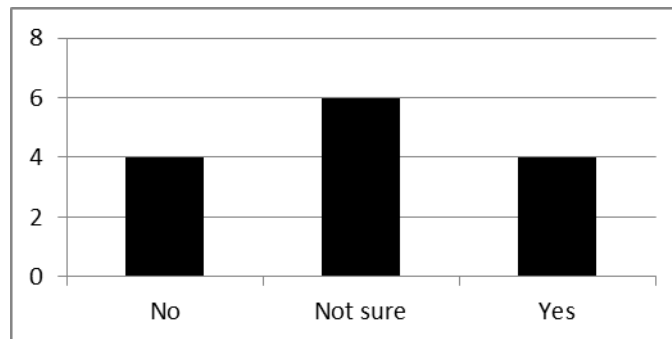
Figure 2: Cloud-based email adoption in South African higher education institutions in 2012.



2. Cloud-based email is currently being used for students and alumni at South African higher education institutions, but not by the staff.

All of the respondents who were already using cloud-based email, or were in the process of implementing it, were currently using it for students. None of them were outsourcing staff email. When asked whether they were planning to use cloud-based email for staff within the next two years, however, a fair percentage (four from fourteen) of the respondents indicated that they would consider doing so. The responses shown in Figure 3 indicate that there is still uncertainty as to whether outsourcing staff email at higher education institutions would be an acceptable solution.

Figure 3: Cloud-based email adoption for staff in South African higher education institutions.



Comments from the respondents on this question (shown in Table 1) indicate concerns about being able to provide staff with an adequate level of service, and being able to ensure compliance. The comments also indicate that building confidence in cloud-based services is a prerequisite before using such services for staff.

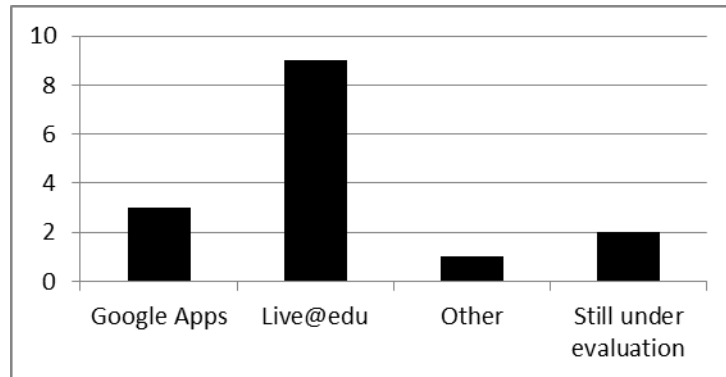
Table 1: Comments regarding cloud-based email for staff.**Comments regarding cloud-based email for staff at higher education institutions**

- Staff email should stay on premise, allowing you to implement the stricter compliance controls needed. Staff have become accustomed to the email performance received over a LAN connection. Experience with a higher latency and more restricted bandwidth would be a major problem.
- The issues could be those of low speed connections and privacy issues. Some institutions could be adamant to hand over control of email to a third party.
- Concerns about backups/archiving.
- Still a new concept. Give it 18 months. Concerns about bandwidth.
- I think it is a question of confidence. I am not worried.
- Concerns are legitimate. Concerned about data security and IP management.
- Need management to buy in.
- Security, legislation, reliability and integration are key issues.
- Concerns regarding the security of information, control of intellectual property, high availability and backup/restore.
- There are still some challenges, such as the legal requirements.
- We are approaching this by building confidence in related-cloud services (calendar, docs) first.
- This is dependent on the university bandwidth, and the ability of the ICT department to deliver an efficient, seamless service.
- The dependence on bandwidth is a concern; we would not want to compromise quality of service to our campus community.
- I would like a "mail for life" service. If the domain reflects the institutions' name, it complicates staff mail.

3. Live@edu is currently the most popular cloud-based email provider for South African higher education institutions.

As shown in Figure 3, nine out of fifteen (60%) of the institutions who are currently using cloud-based email, or who indicated their intention of using cloud-based email, have chosen Microsoft's Live@edu solution, as their preferred solution. Interestingly, five out of the six institutions, which are already using cloud-based email (83%), are using Live@edu.

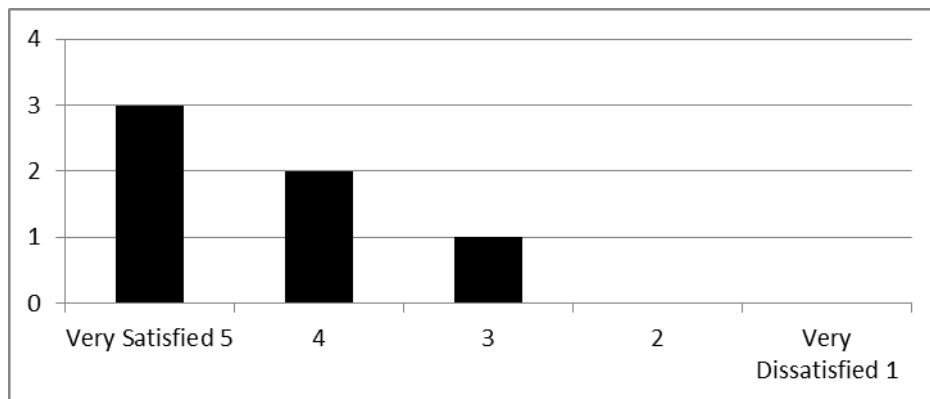
Figure 4: Cloud-based email providers preferred by South African Higher education institutions.



- South African higher education institutions are satisfied with the service they receive from cloud-based email service providers.

Most of the institutions surveyed that are currently using cloud-based email are satisfied with the service they receive. This is depicted in Figure 4. In fact, 50% of the respondents rate themselves as being very satisfied with the service they receive. Not a single respondent was dissatisfied.

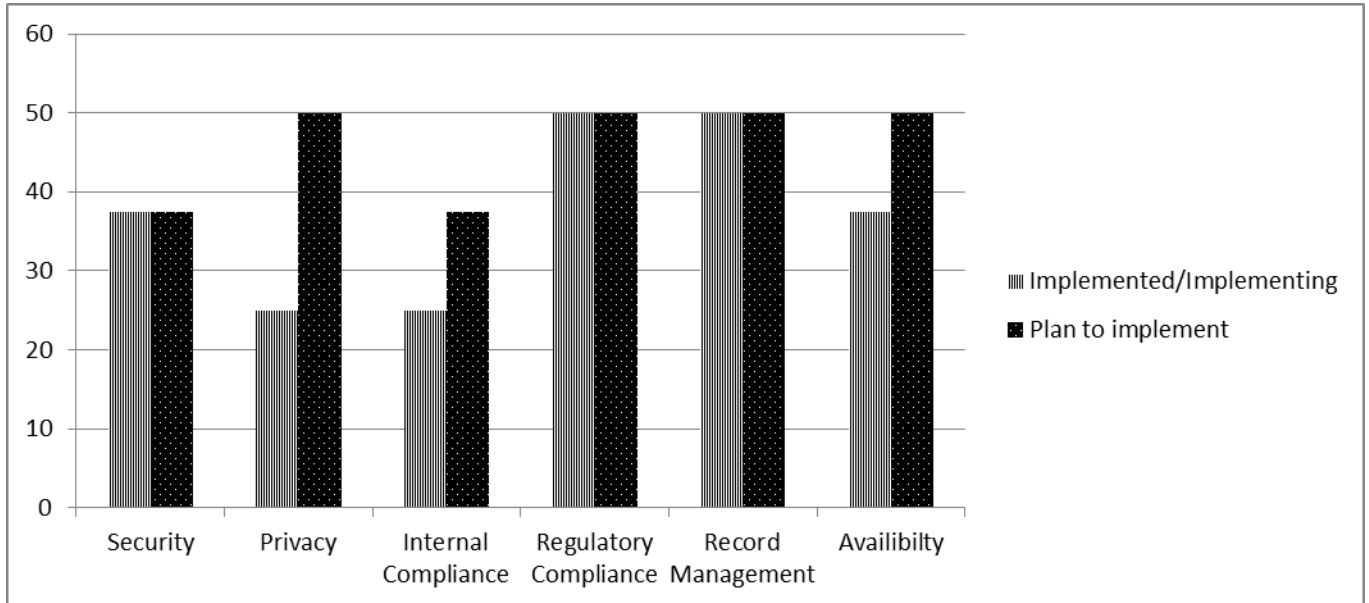
Figure 5: Satisfaction with cloud-based email in South African higher education institutions.



- South African higher education institutions do have noteworthy concerns about the use of cloud-based email.

Despite the tremendous uptake of cloud-based email, there are concerns regarding the use of this service at higher education institutions in South Africa. Of the sixteen respondents to the 2012 survey, 71% indicated that they do have concerns regarding the use of this service. Figure 6 highlights what some of these concerns are. Regulatory compliance and record management are the issues, which most concerned the respondents.

Figure 6: Concerns regarding cloud-based email in South African higher education institutions.



When given the opportunity to highlight other concerns, IT managers listed, amongst other things, vendor-lock in and integration issues as concerns. Some comments regarding concerns are shown in Table 2. As Figure 6 shows, there is generally less concern regarding certain issues among institutions who are already using cloud-based email. This seems to indicate that confidence in cloud-based email increases with the adoption of this service.

The majority of institutions will use cloud-based email in the future, or are currently using it, and are satisfied with this service. Still, there are many noteworthy concerns regarding the use of this service. This is troubling.

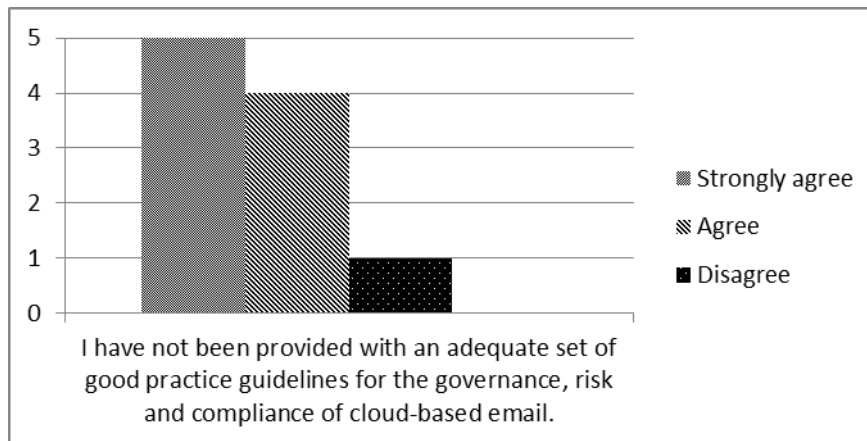
6. South Africa higher education institutions feel that they would benefit from a set of guidelines for compliance when using cloud-based email.

In 2009, seven out of eight respondents either agreed, or strongly agreed, with the following statement: I have not been provided with an adequate set of good practice guidelines for the governance, risk and compliance of cloud-based email. This is shown graphically in Figure 7. Interestingly, the one university that disagreed with the statement did not give an indication of any guidelines they would recommend for cloud-based email implementation when prompted to do so. Further emphasizing the important role of a set of guidelines for compliance in using cloud-based email, participants in this year’s survey were asked: “Do you think that South African universities would benefit from a set of guidelines for compliance in the adoption of cloud-based email?” Only one out of 17 institutions responded: “No”. The vast majority of institutions (94%), therefore, believe that such guidelines would be beneficial.

Table 2: Comments regarding concerns about cloud-based email.

Concerns regarding cloud-based email at South African higher education institutions	
•	Standard email address formats and display details. Address the risk of institutional reputation damage if user behaviour is non-conformist to policy.
•	Vendor lock-in. What happens if you want your email/data back? Will the vendor transfer the data/information to another vendor?
•	Privacy issues. Compliance – How are you going to handle this? Content of the contractual agreement.
•	Availability is the major concern – need to improve internet access availability first.
•	Location of servers/data centres with relation to e.g. Patriot act; Institutional readiness/culture.
•	Be aware that international bandwidth will be used. Asaudit must lobby that both providers (live@edu & Google) should allow/plan a local staging/ proxy, so that university connections are to local bandwidth.
•	Governance standards, DRP, standard operating (user) guidelines, storage and retrieval, privacy, State regulatory compliance.

Figure 7: Need for cloud-based email guidelines.



Considering the important role of email, it is perturbing that IT professionals feel inadequately equipped with regard to the governance, risk and compliance of cloud-based email, and are apprehensive about compliance, in particular.

CONCLUSION

Cloud-based email has the potential of positively impacting on the delivery of email services at educational institutions. These institutions may derive benefits, such as reduced costs, easier email administration, larger inboxes, and access to additional services, such as instant messaging and online storage for their customers if they utilize cloud-based email. South African higher

education institutions are readily adopting cloud-based email. Those using cloud-based email for their students are satisfied with this service.

There is, however, concern about whether cloud-based email can be used in a way that is secure, available and compliant. These concerns will have to be addressed, in order for potentially valuable cloud-based email solutions, to be confidently adopted by South African higher education institutions. There is a lack of adequate good-practice guidelines for ensuring the governance, mitigation of risk and compliant use of cloud-based email in higher education institutions in South Africa. Such guidelines could improve users' confidence, when deciding to implement cloud-based email.

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