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BYOD concept and issues relating to adoption in learning institutions

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Abstract

As Information Communication Technology (ICT) has evolved, the overall physical size of computing devices has gradually decreased due to advances in the microchip technology; com`puting processing power doubles every few months and at the same time the cost of the computing devices has continuously been going down. What this means is that today, the general citizenly in every economy have every powerful devices within their hands for personal use. With the growth in internet and interconnectivity between devices, all these devices already have access to the internet where they can be able access vast amounts of information resources and organizational systems (school included). With the global shift to internet based systems, this combines to add immense power to a knowledge/information based societies. Schools and other learning institutions are at the verge of being transformed by the growth of this digital content/transformation. Students from their early years of learning have access to these powerful devices and most of them now how to operate them. Learning institutions on the other hand face the challenge of acquiring computing devices especially with the drive towards one device a student, driven by the rising financial needs to sustain education hence limited budgets to acquire and maintain computing devices. Bring your own device (BYOD) offers an opportunity for learning institutions to exploit the power of the devices that students and staff have to drive the delivery of digital content. However, this is not easy as it may sound even thou beneficial. Several issues have arisen as regards BYOD adoption in schools and addressing them would be critical for its success. This paper looks at these issues, and provides an approach on how each of these issues can be handled to provide an inherent framework for BYOD adoption.

Key Words: BYOD; Technology, ICT, Knowledge, performance

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Introduction

The proliferation of affordable computing devices and technology in the 1980s and '90s had organizations scurrying to adjust to the trend of employees using non-corporate devices for work. Being off the IT radar, portable computers and first-generation handheld devices confounded many organizations that recognized their utility but could not fully embrace them because of the command and control issues they raised [1]. Today, with even greater advances in consumer technology, mobile applications and the affordability of smart and powerful mobile devices, organizations are more challenged than ever to incorporate them into the enterprise IT architecture.

In the last four decades, educational systems themselves have frequently attempted to adopt trends in business to the educational process. The BYOD trend is no exception. According to [2], Bring Your Own Device, or BYOD, is the simple idea that young people and school staff are allowed to bring their own Internet-enabled device into school and use it to help them work, learn and (if appropriate) socialize. BYOD is a powerful wave that hasn't yet crested for teachers, school districts, and the IT professionals who support education [3]. Allowing staff and students to use their own devices within learning institutions yields many benefits.

The concept of BYOD is explained best by [4] who opines that company and institutional computers are left to run idle for long durations. In the case of schools, institutional computers remain idle overnight; much of the time during the day and for over 3 months annually when schools are on holiday. These devices therefore are underutilized. Over the last few years, laptops and handheld mobile devices have become affordable and provide users with 24/7 access to ideas, resources,

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people and communities [5]. Imagine the benefits of allowing students to use the powerful computing devices that they are so much familiar with; that they are always carrying in their pockets. These devices include laptops, smart phones, tablets and other portable digital assistants (PDAs).

It therefore points to that, combined with the right pedagogy, and if used responsibly, technology in education can be a major transformative tool in the delivery of content; ensuring the 'one device per student' is achieved; enabling learners to collaborate with teachers and peers as well as act as a vehicle for personalized learning by ensuring that each student is fully engaged in learning and is successful in fully attaining established learning standards.

Literature review

The promises, pitfalls and results associated with technology in schools have been researched, discussed and debated for many years. What educators have found is that the range and effectiveness of technology use in augmenting learning varies considerably depending on the types of tools and software used, the context within which they are used and the degree to which student interest, motivation and engagement is triggered[5]. This is compounded by the influx of personal smartphones, tablets and laptops that connect with and use corporate resources, a trend that is challenging companies to walk a fine line between channeling the benefits of employees purchasing and using their own mobile devices and making these devices secure and cost-effective enough for the enterprise [1].

BYOD is a consumer-led movement that is transforming enterprise workspaces by extending the notion that 21st century employees need to work from anywhere, at any time and on their devices of choice, both within and outside of the traditional

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corporate structure. BYOD is not only disrupting the traditional way technology is provisioned, paid for and used, but it also promises the dual benefits of simultaneously driving down IT costs while improving employee productivity and satisfaction.

BYOD extend to all institutions, whether private or public, big or small, that are dependent on computers in some way. [3] opines that in the private sector, the reality is that BYOD of laptops and notebooks is more smoke than fire. Examples of large-scale BYOD of laptops and notebooks are rare and the expected savings questionable. He notes that in recent years, BYOD seems to have taken on a new aspect: that of mobile devices, particularly driven by the popularity of tablets and SmartPhones. These devices are already in the hands of employees as well as students and have been bought completely independently of the organization, and the organization has already allowed limited connectivity to corporate assets via the corporate network: generally email, calendaring, and Internet access.

In the case of BYOD in education, [3] notes that it has been inherently difficult to define and a source of much debate; with arguments that BYOD is the ability for a student to take home a school-procured computing device; students procuring their own computing device and bringing them to class or students being able to bring any personally owned device(s) into the classroom, which support a second, standardized device either provided by, or dictated by the school. All these arguments create a distinction and tension between who controlled the device and who funded the device thus in some way, they are inherently related. Thus, the most significant issue in defining and understanding the BYOD concept is not the device, but the delivery of software and services that impact educational activities. Student and teacher owned consumer technology has continued to impact every

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aspect of educational ICT: technology strategy and procurement, pedagogy, assessment, professional development, policy and even nature of teaching itself. Thus, BYOD is a concept that will continuously have great impact in the education sector.

Reliance on Mobile telephony

Kenya mobile telephony industry accounts for 7% of mobile phone subscribers in sub-Saharan Africa. According to CCK quarterly report (2010/2011), September 2010, Kenya had 22 million mobile phone subscribers[6]. The International Telecommunications Union (ITU) report says that Kenya has the third highest number of subscribers, after Nigeria and South Africa which respectively account for 26% and 19% of mobile cellular subscriptions in sub-Saharan Africa. Mobile penetration in Kenya's telecom market is expected to grow by 95% over the next five years. By the year 2015, Kenya had more than 33 million mobile subscribers, with a mobile penetration rate of 80%. this reinforces the findings of an earlier research by [7] which predicted that the number of mobile phone users would more than double within the next 5 years beginning 2010. What this points to is that more people seem to be dependent on mobile phones and other hand held computer devices than on personal computers.

Simply put, the global trend, at least for now, shows an increasing trend on the dependence of mobile computing [8]. This offers schools and learning institutions an opportunity to leverage on the scarce resources that constraint the acquisition of computing and related devices by making use of what students and staff already have to drive performance.

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Out of these mobile devices, [9] opines that over 70% of them are smart phones (internet enabled devices). This obsession and demand for smartphones can be thus considered to be the key driver for mobile apps. Perhaps another key development that can be related to the demand for BYOD is the standardization of the mobile operating system platform and a shift to the Open Source Software (OSS) Android. In essence what this has done is made it easier for users to be able to operate a large number of mobile devices easily as the standard is similar[10]. This creates an opportunity for BYOD adoption in that the availability of a standard platform enables firms to develop a standard approach for adoption. It eliminates the bottlenecks for schools and other learning institutions to ensure ease of use of the BYOD.

BYOD Issues

BYOD presents many benefits as well as challenges to earning institutions. These challenges are presented by both students and staff and usually relate to the security of institutional information.

Benefits of BYOD concept

According to [1], BYOD holds the promise of not only enabling companies to become more agile and customer-focused institutions, but also helping employees rapidly create and apply knowledge at work, which is key to deriving competitive advantage in a knowledge-driven economy. Even in the education sector, the attraction towards BYOD in education is both as obvious as it is superficial. Many stakeholders in the education sector see BYOD as a way to reduce costs, effectively pushing out the cost of procuring student devices to parents. There is belief among many that BYOD will reduce the ICT budget, and enable schools to

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continue, or even expand, one-to-one student device programs. However, this view does not take into consideration the potential new costs associated with supporting BYOD.

One of the major benefits of BYOD adoption is considered to be improved user productivity. Whether an employee in an office or a student seated in a classroom; the fact that they are using a device that they are much familiar with to perform work of class related duties means that they can better interact with it (human-computer interaction) hence making them more productive in the performance of their chores (ease of use). This is supported by [1] who opines that BYOD provides the flexibility that employees seek to respond instantly to work requests outside of work hours, thus reducing process times and improving operational efficiency. In addition, employees report higher satisfaction levels with such flexible work arrangements and the freedom to use their devices of choice.

Can the use of E-learning be considered to be BYOD? If so, then the promise of BYOD holds more promise in the future than in the past. It is transformational not just for schools but also for the general enterprises. What about telecommuting / teleworking can these too be considered to be a part of BYOD? If so, BYOD holds the promise not just of improving performance but also of helping in the reduction of the environmental footprint of Information Technology (Green IT).

BYOD also promises considerable cost savings if employees are willing to bear the cost of purchasing, maintaining and upgrading the devices they use for work. Though BYOD necessitates a one-time, upfront investment to create the support infrastructure, it can result in lower total cost of ownership in the long run. There

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have however been questions regarding whether it is morally right to transfer the cost of acquisition and maintenance of IT infrastructure to the parents.

More interesting, BYOD student/staff-owned devices equipped with enhanced mobile services allow students and staff to collaborate in real time and finish their tasks efficiently by responding quickly. With virtualization, ubiquitous connectivity, anywhere access to school data regarding to things such as assignments, notes, textbooks, exercises and innovative mobile apps, the opportunities for collaborative ways of studying from home and during free time have grown immensely. Simply put, students can easily collaborate with their teachers and get immediate feedback on tasks and assignments. This makes education delivery fun and engaging.

Challenges of BYOD adoption

The use of such devices to create and process University information and data creates issues that need to be addressed, particularly in the area of information security. The University must ensure that it remains in control of the data for which it is responsible, regardless of the ownership of the device used to carry out the processing. This is supported by [1] who argues that Transitioning to a BYOD model should be phased in over time. Organizations need to mitigate security risks, such as inappropriate usage or loss of corporate data and the ensuing financial and legal implications. He further cautions that advances in consumer technology and device heterogeneity are creating complexities that can inherently turn into nightmares for IT if not handled properly.

Establishing effective governance mechanisms to ensure data privacy and security can be challenging when embracing a BYOD philosophy. It must also protect its

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intellectual property as well as empowering staff to ensure that they protect their own personal information.

Providing support for the numerous devices used by students while offering the potential for significant reductions in overall support costs is a major implementation challenge. IT departments may be overwhelmed if they lack the appropriate resources to implement the changes necessary to support BYOD.

Addressing BYOD challenges

A number of issues regarding information security posed by the BYOD concept were identified earlier in this research. To counter, all relevant institutional information policies should be extended to staff and students using BYOD. In particular, this becomes critical to staff who have access to an institution's databases especially relating to students, other staff members or even the institution itself. To safeguard this, proper BYOD policies must be developed and linked to the institutional Information Communication Technology (ICT) policy.

In particular, such policies must ensure that staff using BYOD must at all-time take all reasonable steps to[11]: Prevent theft and loss of data; keep information confidential where appropriate; maintain the integrity of data and information, including that on campus and Take responsibility for any software they download onto their device.

It is also opined that the potential to save money depends on how well organizations understand and manage the required expenditure[1]. Companies run the risk of unnecessary BYOD outlays, such as reimbursing employees' mobile expenses, processing related expense reports, investing in solutions to support

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heterogeneous devices and customizing apps to run on those platforms[12]. This is unless clear policy guidelines are provided to ensure that users of BYOD know the responsibility of the institution over the device. In most cases, these policies will tend to remove the liability of such devices from the institution and leave it to the owner/user[13].

The digital gap

One of the biggest dilemmas posed by growth in technology has been related to the digital gap created by the technological divide between the digital-haves and have-nots. In handling pupils especially in primary schools, how this is handled can be a great contributor to the motivation of students especially those who may not have these technological devices[14]. Not every student can afford these devices. How then should the use of BYOD be encouraged while still exercising the necessary caution to avoid disadvantaging the others?

Overcoming BYOD barriers in schools

The benefits presented by BYOD make it worth proactively pursuing by every learning institution. To support the myriad devices, configurations and applications, learning institutions need to have a robust and scalable infrastructure. Additionally, they require support staff, especially IT expertise, to acquire the appropriate skills to manage this new environment and infrastructure.

A platform- and OS-agnostic BYOD infrastructure will provide controls to limit security breaches, as well as minimize organization support and management of employee/student-owned devices especially with regard to access to school resources[15]. By deploying the right combination of solutions, schools can secure

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and quickly update data on employee devices, as well as perform compliance reporting. It can also provide IT departments some degree of visibility and control over the devices and apps used by the students and staff.

Conclusion

It is clear that schools just any other organization stands to gain most from BYOD adoption. Yet its adoption comes with challenges that need to be addressed before infrastructure can be put in place to turn this useful technology into a reality. One notable example is the provision of clear policy guidelines on the adoption of BYOD. Recognizing the power of Information Technology and developing approaches that can be used to handle any issues that may arise in the same. Ways to handle the social impact of BYOD should also be well articulated, this should ensure that every person feels a part of the system and works to the achievement of the set goals of the school/learning institution without affecting the motivation of those who can't afford these digital devices. This could for example be by providing devices to those who can't afford for use within the school and even allowing them to carry the devices home. Clear policy frameworks are also needed from the government for adoption of such technologies.

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