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Massification of tertiary education sector in Ghana and Implementation of "m-learning" - Case study of Pentecost University College.

Eva Esther Shalin Ebenezer,
Department of Commerce,
Faculty of Business Administration,
Pentecost University College, Ghana.
Email: evashaline@gmail.com

K.B.Omane-Antwi,
Vice-Rector,
Pentecost University College, Ghana.
Email: kbomane@yahoo.com

Abstract

This research paper aims at increasing tertiary educational level in Ghana by introducing m-learning, which will reduce barriers like cost, mobility, distance and massification. The use of mobile phones is much greater than the use of internet in Ghana, hence m-learning. This project portrays all features of a traditional classroom in a distance learning environment through the use of smart phones. These devices are reshaping user's daily lives in a lot of positive ways. Going one step higher from social communication to mobile learning as a core pedagogical activity in higher institutions of learning is the aim of this paper. Distance learning and e-learning have come a long way, but m-learning will be the primary mode of delivery in future in all kinds of learning streams. UNESCO states the Gross Enrolment percentage for tertiary institutes in Ghana is around 8% of the country's population while the completion ratio could be a bit lesser due to various economic factors. The aim of m-learning is to increase the enrolment ratio in tertiary educational institutes by giving easier access to students for Universities from their own comfort zone in this era of massification in universities. The current International student population of Pentecost University College, is 136 which comes from Botswana, Burkina Faso, Chad, Congo, Cote d'Ivoire, Equatorial Guinea, Gabon, Lesotho, Madagascar, Nigeria, Togo, Seychelles, Sierra Leone and Zambia. PUC is the chosen organization for the project m-learning which will equip the West Africans on a stronger footage in the tertiary educational level. A trial run of Moodle LMs is currently undertaken at PUC. M-learning will be done in two stages with the first one using BYOD concept. The second stage will see PUC establish study centres where the mobile reach is still not very viable due to poor telecommunication signals.

Keywords: *m-learning, e-learning, tertiary education, online-learning, massification.*

1. Introduction & Case Organization

1.1 Introduction

The recent trend in Ghana has been to use mobile phones or other handheld portable devices and wireless technology for social and economic usage. Gone are the days when the tutor was the only repository of knowledge. The current generation which uses the traditional mode of classrooms, use wireless portable devices to enhance learning and will let the tutor know that they are abreast with technology and information. This paper aims at improving the tertiary educational level to world standard. It aim is to reach the prospective students all across Ghana These devices are reshaping users daily lives in a lot of positive ways. Going one step higher from social communication to mobile learning as a core pedagogical activity in higher institutions of learning is the aim of this paper. Distance learning and e-learning have come a long way, but m-learning will be the primary mode of delivery in future in all kinds of learning streams because of its ease of use.

UNESCO states the Gross Enrolment percentage for tertiary institutes in Ghana is around 8% of the country's population while the completion ratio could be a bit lesser due to various economic factors. The aim of m-learning is to increase the enrolment ratio in tertiary educational institutes by giving easier access to students for Universities from their own comfort zone in this era of massification in universities. m-learning will facilitate students all across Ghana to attend tertiary education at the ease of their workplace or homes due to massification of the education sector.

1.2 Case Organisation

Pentecost University College (PUC) was founded in 2004, by the Church of Pentecost (COP) to provide sound Christian-based tertiary/higher education. PUC started with a number of 171 students in 2005. The students' population as at 19th December, 2011 was 3,874. The current International student population is 136 come from Botswana, Burkina Faso, Chad, Congo, Cote d'Ivoire, Equatorial Guinea, Gabon, Lesotho, Madagascar, Nigeria, Togo, Seychelles, Sierra Leone and Zambia. PUC is the chosen organization for the project m-learning (mobile learning).

2. Emerging Technologies as Potential Solution

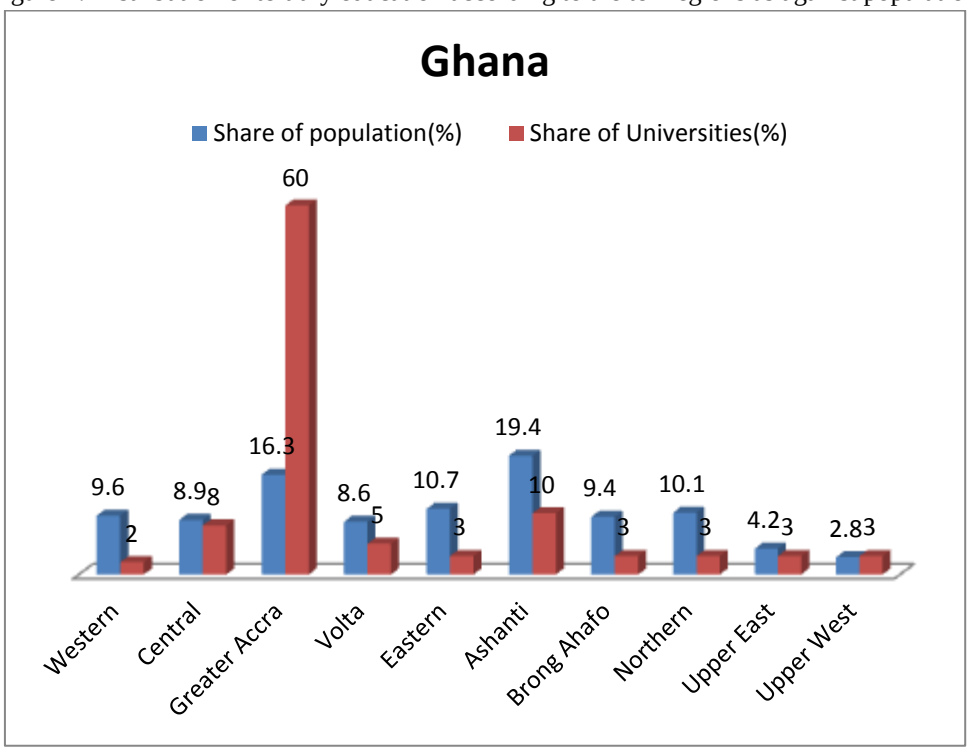
2.1 Literature Review

Brown T[1] explains that the most The University of Pretoria started using mobile phone support during 2002 in three existing programmes of the Faculty of Education. This m-learning pilot project was launched based on the fact that more than 99% of the 1725 learners enrolled for these three programmes by the end of October 2002, had mobile phones.An interesting fact in this research was that 100% were full time employees and of that 83.8% are between 31 to 50 years and 97.3% are non-white. The majority of these learners live in deep rural areas with little or no fixed line telecom infrastructure.

2.2 Background Study

Ghana is divided into ten regions with the country's capital Accra, which lies in the Greater Accra Region. The following statistics compiled from the National Accreditation Board clearly states that the Universities are crowded in the Greater Accra Region which makes it difficult for the other region youth to aspire for good education without spending a huge amount on accommodation and other living expenses apart from fees. According to Bucyana O , Sikanartey T[2] state that 55% of Ghana's population use Mobile phones at the end of first quarter of 2009 and internet usage as of December 2011 was 8.4% of the population which is around 24 million as on 2011 according to Internet World Stats. Figure-1 shows the uneven distribution of tertiary educational organisations across the ten regions in Ghana. This makes access to tertiary education an unfulfilled dream for many.

Figure 1: Distribution of tertiary education according to the ten regions as against population.



Sources : National Accreditation Board, Ghana & Ghana Statistical Service.

Traxler[3] defines "mobile learning as wireless and digital devices and technologies, generally produced for the public, used by a *learner* as he or she participates in higher education". The use of mobile phones has brought a lot of technological advancement and ease of access to information even in developing countries like Ghana. According to UNESCO, Twenty Eight thousand and Fifty five (28,055) students graduated from all disciplines in the year 2011 from the traditional method of classroom through regular, evening and weekend schools.

The regular school students attend lectures throughout the day (maximum of two), with

each lecture session lasting for 3 hours. Each semester the student might learn a minimum of four and a maximum of seven courses depending on the programme. Most often these students are not workers. The evening school students are mostly workers in and around Accra. They travel all the way for their lectures every evening during the week. The weekend school operates on Friday evening and Saturday. Workers from all around the country travel to Accra to learn during weekend. It causes a lot of time, cost and effort combined with utmost dedication from the part of student to pursue weekend or evening school.

2.2 Technology Adoption

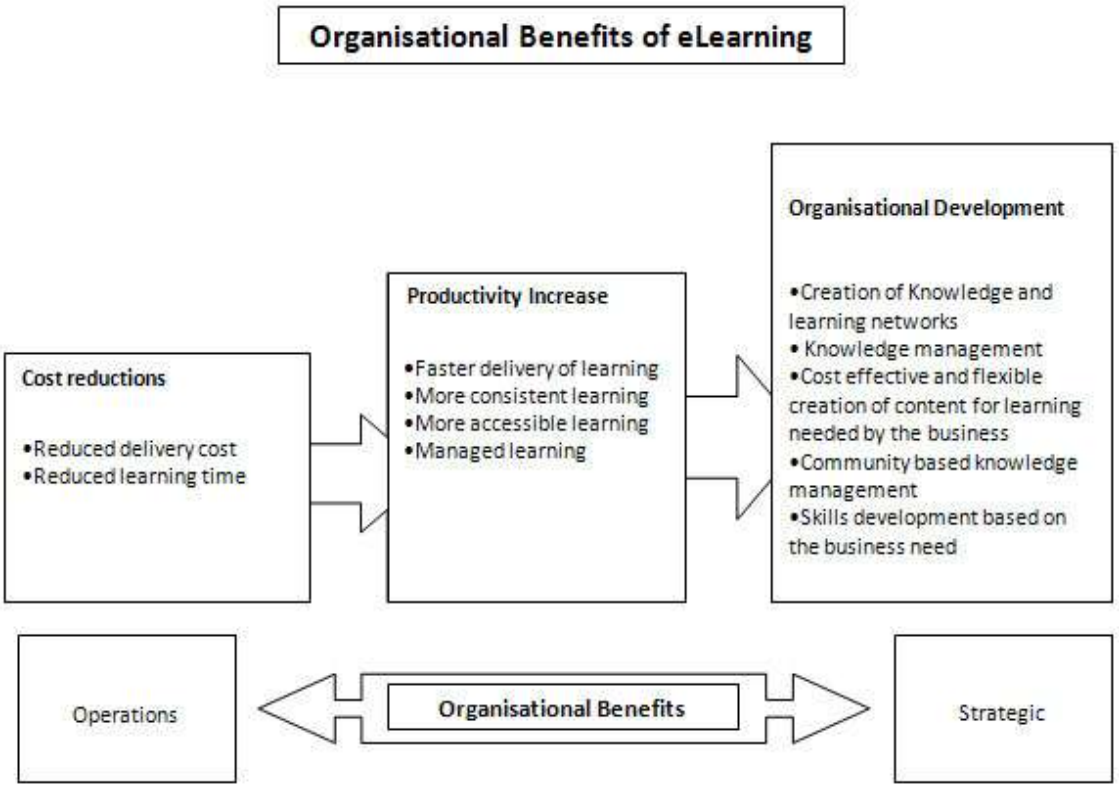
Currently, there are three Faculties in PUC, namely Faculty of Theology, Faculty of Business Administration and Faculty of Science, Engineering and Computing. These three faculties will pioneer the distance education program facilitated by m-learning, which will allow the learners to utlitise the existing mobile and wireless technology to ease learning. M-learning will solve that problem. Massification in Universities is another cause for alarm, which might compromise on quality of the graduates. m-learning will allow the learners to learn in a disciplined manner but in modern classrooms at their comfort from anywhere in Ghana, instead of the traditional classrooms where they need to be physically present for lectures. With the "Big Shift" in mind, we are plunging into the foundation wave with new digital technology infrastructure supported by strategies and policies to achieve economic liberalization. The next stage, flow, focuses on flowing of knowledge, capital and talent. Finally impact wave centers on the consequences of the first two. M-learning will increase the potential of learning since there will be a knowledge base with a lot of input from contributors across the globe which will aid open source. There will be two phases in this m-learning project.

Phase1 : m-learning from PUC Sowutuom Campus with internet study centres across the ten regional capitals.

Phase 2 : m-learning with backup of five internet study centres in each of the ten regions.

The launch of m-learning Phase I will be at PUC, Sowutuom campus. Taking into consideration the disruption and not so strong but developing communication network in the country, the backup up study centres could be resorted to incase of any necessity without causing a break in learning. It will still be a reasonable bet rather than travelling to capital Accra for learning.

Figure 2: Benefits of e or m-learning for the organization



2.3 Strategy

Every lecturer in the University has to teach mandatory twelve hours every week, which will be two courses taught for both regular and evening. For Head of Departments and Deans the mandatory hours differ. Apart from teaching, research and community development is part of every lecturer's work plan. The lecturers develop a course outline and prepare teaching materials to suit them. The timetable will be uploaded by the Academic Registrar.

Step: 1 Lecturers will be assisted to upload the course material, course outline, assignments and lab exercises in pdf format, in a Private cloud to be owned by PUC (See Figure-2), which could be shared later with sister universities. Rouse M(2010) defines private cloud as "a proprietary network or a data center that supplies hosted services to a limited number of people. When a service provider uses public cloud resources to create their private cloud, the result is called a virtual private cloud". The aim of cloud computing is to provide cost efficient, easy, scalable access to computing resources and IT services.

Huth A, Cebula J[4] defines three types of cloud providers. SaaS provider gives subscribers access to both resources and applications. PaaS provider gives subscribers access to the components that they require to develop and operate applications over the internet and in an IaaS agreement, the subscriber completely outsources the storage and resources, such as hardware and software, that they need. With careful analysis PUC has to choose the level of control over the information and types of services that PUC would want from a cloud provider. Infrastructure as a service (IaaS) would be a better option due to the confidentiality

nature of the students' academic records. CISCO(2011) explains Multiprotocol Label Switching (MPLS) Transport Profile (TP) as one which " enables you to create tunnels that provide the transport network service layer over which IP and MPLS traffic traverse. MPLS-TP tunnels enable a transition from Synchronous Optical Networking (SONET) and Synchronous Digital Hierarchy (SDH) time-division multiplexing (TDM) technologies to packet switching to support services with high bandwidth requirements, such as video". The main reason behind MPLS-TP selection is to have better quality video download.

Step: 2 Regular lecture sessions will be streamed live with chat option for students to query the lecturers. The lecturer will initiate a discussion forum and students will answer in the respective threads. Assignments and discussion forums will have deadlines like Moodle Learning Management System. m-learning studio is the suggested software for the implementation of m-learning project. If a student misses the live stream, the download video will help him.

Step: 3 Objective type Final exams will be conducted for most courses. Some courses might opt for Hands on Project work or long essay depending on the course content.

2.4 How does it work?

It is assumed that all stakeholders will Bring their own device(BYOD) which requires a little more effort in synchronizing the content for the smart phones. PUC can opt for supplying a particular mobile device as part of the curriculum in stage 2 due to financial issues but will start with BYOD.

The stakeholders will be granted certain privileges depending on their level. They are allowed to operate within those privileges. Each user will be given a unique code with a password of his / her own choice. The pdf files can be easily downloaded onto mobile devices using Adobe reader mobile. MPLS-TP will enable better quality video download.

m-learning will facilitate better learning, but requires orientation and training for the facilitators to upload the material, get equipped to teach to an empty audience facing the camera and to use technology effectively to answer questions in chat mode. It also requires discipline from the point of view of the lecturers, since the whole system is time-based. Assignments, discussion forums, blogs, chat rooms etc., need to be systematically approached in a consistent, timely and repetitive manner.

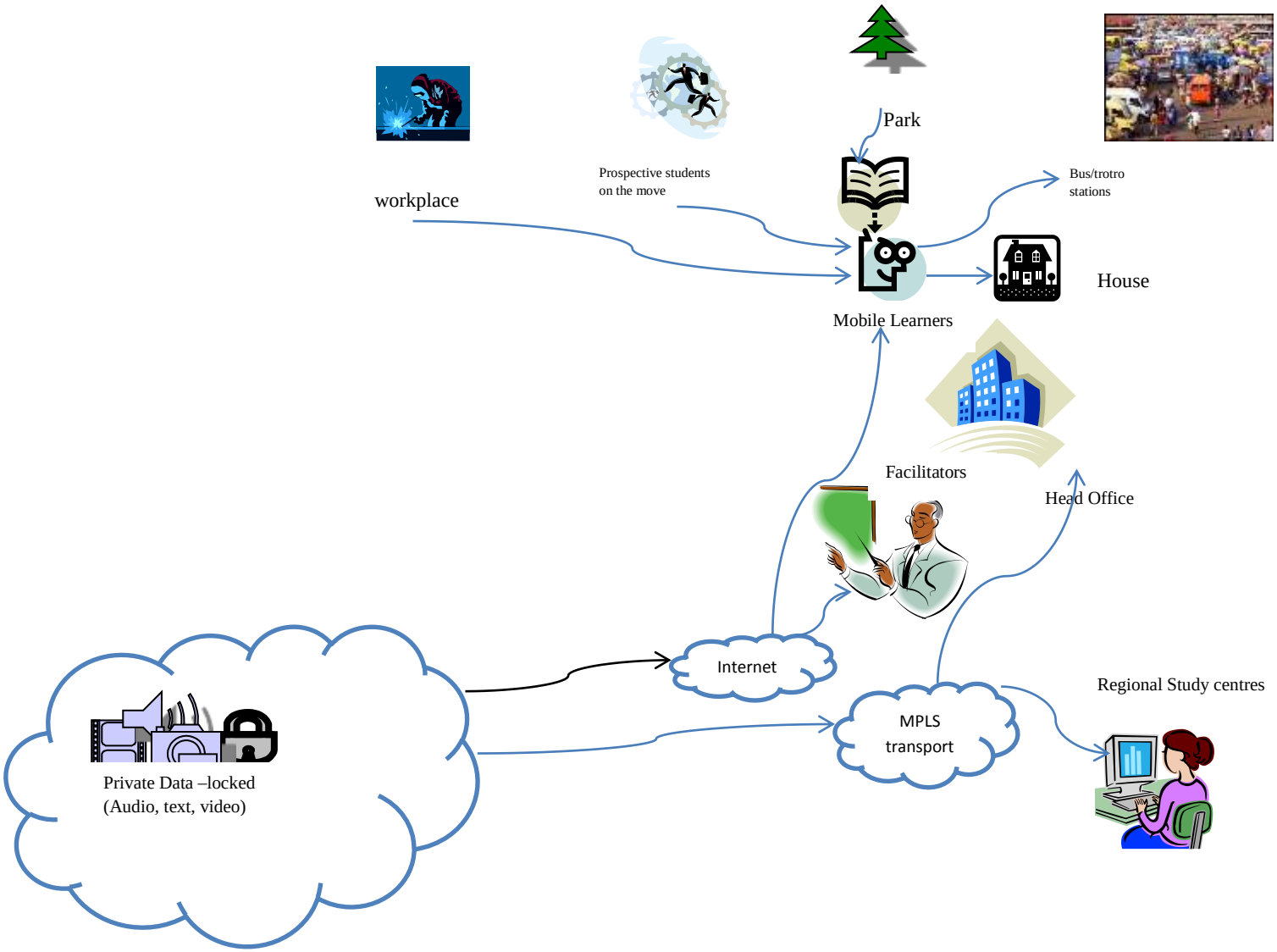
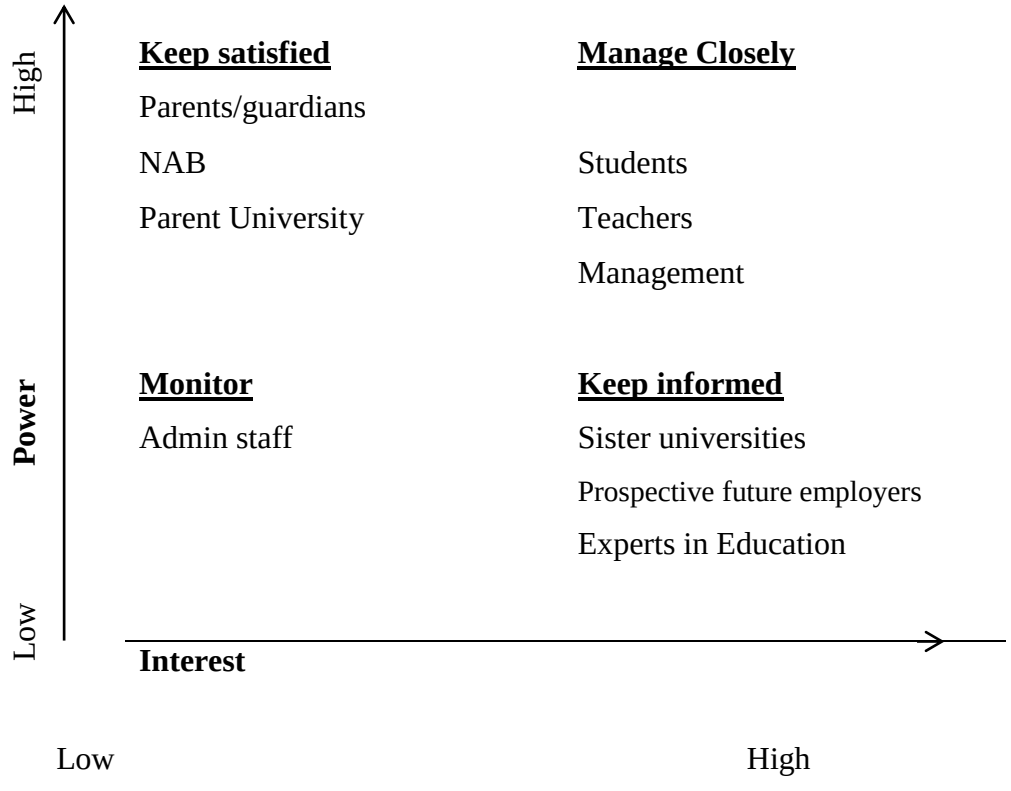


Figure 2: Researchers (2012)Cloud computing based m-learning

3. Key stakeholders

Business Dictionary defines stakeholders as "a person, group, or organization that has direct or indirect stake in an organization because it can affect or be affected by the organization'sactions, objectives, and policies". The primary stakeholders are management, students, administrative staff and teachers. They have a direct interest in the outcome of the m-learning initiative, be it positive or negative. The secondary stakeholders identified are parents or guardians of students, National Accreditation Board, sister universities and prospective employers of our students. Tertiary stakeholders can be our experts in the field of education, who await to test the outcome of this new mode of learning over traditional model classrooms. Universities have adopted a certain pattern for over 500 years and hence there will be a lot of resistance to change. Change is inevitable, but with proper technology adoption strategy, it should not be a major cause for concern. In the case of PUC, the University is embracing change and hence everybody with it should move along else they will be left back, but the decision to adopt m-learning will not change. No lecturer or staff is given an option to layback, since every individual's effort and expertise is critical to the organisation's success in m-learning.



National Accreditation Board(NAB), the governing body of tertiary education in Ghana should be educated about m-learning, so that NAB will be able to grant permission for PUC to launch m-learning. They should approve m-learning before it can be launched. It would be a better option if a National policy on m-learning is formed. This will sort out all issues

related to m-learning and its governance. This comes under the Legal and Regulatory compliance risk category. M-learning will soon spread across the globe and could cater to the needs of Ghanaians who are abroad. PUC is a University founded by COP, which has spread its wings over 84 countries, who are also our potential clients. All the above mentioned risks need to be treated. Risks need to be monitored on a regular basis to check for priority and implement risk management plan.

4. Conclusion

Murugesan, Unhelkar [5], suggest that any "Successful implementations require full understanding of the business, the domain in which it exists, and continuous improvements during the implementation process". Attewell J, Savill-Smith C& Douch R[6] state that "Of over 900 learners who responded to an SMS survey, 91% agreed that mobile learning did help or may help them to learn; 93% believed that it did or sometimes did make learning more interesting; and 84% wanted to do more mobile learning in future". With proper understanding of the business the implementation of m-learning will be smooth and will encourage every single Ghanaian to fulfill their dream of receiving higher education.

m-learning holds the future for Africa in terms of life-long learning. Educationists should welcome this technological marvel and accept that m-learning has come to stay and it will be the focus of the future. The sharing of information is instant due to the discussion forums and chat rooms. Each and every one learn together with their peers, by sharing knowledge and motivating all to learn and grow together to grow further academically which will enable the create a better Africa. Howard F[7] says that "Seven of the world's 10 fastest-growing economies are African". Finally, Ganjoo V[8] says there are three challenges for m-learning to be successful in Africa. Limited interactivity, Flash or graphics capability on mobile phones and limited programming skills required to produce mobile learning. Chat and discussion forums with SMS and MMS allows more interactivity, smart phones allow all kinds of graphics to be downloaded and required programming expertise is available currently in Ghana. Organisations like Mobile web Ghana are training students on both technological and business fronts to enable more mobile features available to the user. m-learning assists learners to learn with healthy competition, enthusiastic collaboration, with real time examples and by using Multiple Intelligence. The teacher is not the only repository of knowledge as in the traditional classroom but sky is the limit for information. A clear and well defined learning environment at the comfort of the learner is the icing on the cake. The essence of m-learning is access to faster and easier access to world class tertiary education in Ghana. In a nutshell m-learning supports earn while you learn, since majority of the students in Ghana are forced to financially support their own education. m-learning will assist and create new opportunities for physically challenged people.

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