Cultural Matters in the Design of Technology Enriched Educational Monitoring Systems in Tanzania

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Abstract

Culture is a precarious impact on the approval, adoption and inspiration of educational monitoring systems. The ubiquitous influence of culture in the design and adoption of technology enriched learning systems is of critical importance in the educational context in Tanzania. Automated system serves as an effective way in ensuring that everyone is alert in the teaching and learning environment. However, areas such as psychological, pedagogical, philosophical, and technological and culture play a great role in the implementation of the automated system. This paper mainly focuses on cultural and technological aspects in the design of educational monitoring system with specific reference to Jordan University College. We illustrate challenges and problems in the design and development in the previously mentioned contexts.

In the present era, where technology is taking a huge control in the educational sectors, people interact and communicate at most times. Interaction and communication has been affected by acts that may hinder the progress on the academic arena negatively. There are numerous cases of property loss, death and hindrance of services due to inefficient monitoring of resources. A monitoring system was designed to enhance learning for academic institutions focusing on cultural issues in existence.

The data was collected through structured questionnaires among students and staff at Jordan University college that later led to the design of the proposed technology enriched monitoring system. It is anticipated that the proposed monitoring system will result to recommendations in educational sectors and nurture a more productive, resourceful, responsible and ethical educational stakeholders.

1.0 Introduction

Surveillance is the systematic observation of (groups of) people for specific purposes, usually with the aim of exerting some form of influence over them (Lyon, 2008). The Tanzanian Government engages in surveillance to protect national security and to fight crime, and the

modern corporation engages in surveillance in the workplace to retain control over the workforce. Growing body of evidence that supports the use of mobile apps/Information and Communication Technology in monitoring humans' particularly cultural interventions (Engel et al, 2011).

Meanwhile, privacy is a moral right of individuals that is frequently and increasingly a concern when information systems are used. However, maintaining computer security may be morally necessary to protect correlated rights and interests: privacy rights, property rights, freedom rights, human life, health, and national security. Computer security can also work to undermine rights. (Wiley, 2004)

The paramount thing one should desire when looking at an institution with reference to Jordan University is her safety and efficiency in the teaching and learning process and utilization of funds. This has been significantly hindered by theft of learning facilities, inconsistent monitoring of lectures and learning services that only involves physical follow-ups in class by a few selected individuals in the quality assurance unit. Poor attendance of students and lecturers during lecture hour's has also been massively experienced due to inadequate individuals and the numerous number of lecture room. Moreover, it has not been easy to facilitate the finance department and procurement units among others due poor monitoring practices. Cases have been reported on money laundering and loss of important items in the hostels and the college surrounding. Moreover, cases of welcoming unknown persons in the College premises bring some even greater risks. Another ironically incidence occurs when the guards at the entrance checks students identification by checking their respective identification cards, but not adhering to the expiry dates. The students go on to exchange the same identification cards with colleagues and are permitted through the same gate. It is for this reason that the concept of modernized and advanced monitoring systems bring out a clear picture.

On the other hand, there is the concept of culture, change and identity that may in one way or the other raise some notions as per the Tanzanian context on the rights to privacy and freedom of movement among others. It is at this point that individuals may overlook and ignore the importance of monitoring the activities within the JUCo premises. Initial cases may reveal to be costly and in some cases emotionally demoralizing particularly for the employees and students

and employers that might be victims of the incurred losses. Using remote monitoring system in the institutions in Tanzania and specifically Jordan University College can ease the task of identifying a trespasser, as the user will instantly be furtive with the abnormal activities of the proposed system.

The authors in this paper examine the feasibility of automating the higher learning institutions by proposing monitoring systems. Further, we establish the benefits of having monitoring systems. The authors also analyse the cultural aspects that might affect the changes in the process of automation.

1.1 Background

In the present era technology has impacted and will always impact society. Different innovations and inventions change the way people interact with their environment, with each other and themselves in extension. This directly affects the cultures of the time. Tanzania is famous, if not for anything else, for its culture rich inhabitants. The country is a composition of regions, tribes, each with its own cultures.

Over the past few years, information systems and mobile technology in Tanzania has been adapted on such a large scale. An average of students and staff in Tanzanian higher learning institutions is likely to have access to information systems. This has been facilitated mostly by the ever-cheaper cost of a basic mobile phone as well as broadband. Millions of Tanzanians are online every single day. Technology is transforming lives on the continent every day. Tanzania is home to some of the most mind-blowing and disruptive mobile centric innovation. Mobile banking innovation such as M-Pesa , Halo Pesa, Tigo Pesa have taken financial inclusion to levels not seen elsewhere in the world before. Social networking apps, news and health apps are cropping up every other day; Tanzania is ushering and embracing the digital age just as much as any other countries in the African continent.

Jordan University College is a constituent college of the St. Augustine University of Tanzania. It is one of the institutions that is moving with the trend and changes in technology. Currently, there are various developed information systems in existences namely JUCo Information System

(IS), and JUCo Student Management Information System (SIMS). The introduction of these technologies has brought up some mixed feelings among staff and students as well. Living with the notion of paperless policy and that ensuring that almost everything is done online among the staff. The challenge of keeping with the trend has created some imbalances among the information rich and the information poor.

According to Dion Hinchcliffe (2011) in an online article, current trends in information and Communication technology and telecommunication sectors depict that social media or social networking service (SNS) is one of the big five feats of the next half decade. Collin P. et al(2011) summarizing Boyd and Ellison(2007) documentation, gave a concise definition for the acronym SNS; as the varying nomenclature of websites or web based services having dedicated lists of users and created primarily for the purpose of enabling them build and flexibly share information.

Even though enthusiasts of the monitoring technology across the globe ceaselessly broadcast its benefits, the birth of the monitoring systems has been faced with massive condemnations quite often in history. Several institutions, government and religious entities keep developing new norms to aid the efficient and proper use of the monitoring technologies and the Internet. However, not all these attempts are successful at achieving their desired objectives (Rosse and Kinsley, available online)

As much as technological advancements bring smiles to the faces of millions or billion inhabiting the world, we must neither underestimate nor neglect the impacts and challenges associated with them. While written press reports and articles continuously echo the continuous growth of the monitoring systems, Internet and social media revolution are much more profound: the Internet and the majority of its social platforms are revolutionizing our cultural habits, our ways of entertaining ourselves and our ways of defining who we are; thus, requires a holistic approach to eliminate most of its adverse effects if at all it should be accorded any kind of credibility(Keen 2010).

Irrespective of the various positive and negative appraisals which the modern monitoring systems has been subjected, most commentators still opine that monitoring system will not only

secure the high learning institution into a single community but also, help to improve its education and cultural aptitudes. With the developing nations in the continent of Jordan University as case study, this paper rationally particularizes both positive and negative impacts of monitoring systems including but not limited to any of the following: cybercrime, hacking and privacy, economic, social and cultural impact and contracted craving for academic merit.

1.2 Theoretical Framework

It is clear that the Internet, Information systems have manifested themselves in multifarious fold. It has equally become crucial to initiate and sustain critical reflections on how the use of the monitoring systems ,internet and information systems explains the diversities in the way people react as well as interact within their local environments. The fact that the monitoring systems are dynamic, active and ever expanding makes it difficult to provide a general approach that will reflect different sets of beliefs and perceptions. While trying to offer a conventional approach to facilitate a standalone knowledge that explains the impact that the monitoring systems and information systems have upon education and culture in Tanzania and Jordan University College at a large , social scientists and numerous academic scholars have mixed pictures of collaborative theories built upon general concepts that are critical to equalize various perspectives , opinions and beliefs. Individual philosophical orientation often dictates how different people perceive the effects to the monitoring systems. Although some theories appear to be more convincing than others, no singular idea has completely accounted for the way monitoring systems and the internet have affected African education and tradition.

In other words, to do away with over simplification; work done in this paper has been built largely on information and communication technology theories, which either lend credibility and support positions. They include hi-tech determinism, Mass media equation and coordinated management of meaning theories. These theories are put forward to help understand how the monitoring has impacted peoples' innate or inculcated cultural values and education at Jordan University College.

2.0 Review of Related Literature

2.1 Hi-tech or medium theory

This is a McLuhan theory, posit that Internet technology has in one way or another affected the lives of those who have come in contact with it(McLuhan, 1995). While it can be argued that some changes are more pronounced than others, technology has radically altered the way every individual perceives things. To a wider perspective technology has not changed people's lives, it has also transformed the way people feel and react to things within a society (Griffin, 2000). As sensational as some of these changes may be, it has drawn different sentiments from all and sundry; most people view technology as principal initiator of cultural transformation. In McLuhan (1995) words, "Technological innovations result into cultural change that is human beings invent concepts which bring about innovations; these innovations ends up changing our lives, the way we reason and the way we do things. Thus, technology in some way shapes our cultural values. Information and communication technologies leave no aspect of the human life unaffected. Ranging from workplace to schools and from recreation to politics; technology has in one way or another shaped people's life. Going by McLuhan 's assumption, it is obvious that the Tanzania community and particularly Jordan University is in a midst of a cultural revolution and most people still find it difficult to accept that some things will never remain the same.

Examining Tanzania today vis-à-vis McLuhan's theory of Hi-tech or medium theory, a lot of things have changed. People who have access to the internet and other communication media have adopted the western kind of life either directly or indirectly. With the Internet swiftly cutting across continents, it is definite that cultures would be transferred onto others; globalization through technology will continue to integrate the world into a single universal village where the Internet instills retribalization to humanity. This depicts that the expansion of Internet technology across the globe will continue to influence the lives of individuals within the Tanzanian and African community; and it would extensively be reflective in overall Africa's culture, education and thought processes. Already in the modern era of incessant technological advancement, we are experiencing situation(s) where everyone is in touch everywhere all at once, and in real-time.

2.2 Mass media Reckoning

This theory simply put forward that the media is exactly the same as real life and it predicts why people respond instinctively and spontaneously to communication media as if it were human.

Reeves and Nass(1996) who are proponents of this theory, claim that human beings react to the media(Internet) as real actors. To these theorists, the media create basis for our shared understanding of the society. This theory further explains that the media constructs our reality in various ways. People tend to respond naturally to the media even though they believe it is not realistic to so(Griffin, 2000). Various individual have been noticed to respond involuntarily to the media; reacting in such a way that suggests the media is alive. For example, some individuals would evaluate their success or failure primarily based on what information they read about and accrue on the Internet. A child who desires to be an artiste may be influenced by Diamond's Platinumz album he or she finds on the Internet, while another child aspiring to become a renowned politician may inadvertently start behaving like President Magufuli due to some political debates watched online. This clearly shows that the media is real and isn't just affecting people's sense of reality.

Akin to McLuhan's theory, Reeves and Nass agree that internet technology has in some ways affected the human lives positively and vice versa. Some media platforms like the internet, televisions (TVs) and other types of multimedia gadgets prompt some responses that human beings have developed over a long period of time(Griffin, 2000). For example, our intial reactions to cinema, and when watching live sports on TV are in line with the media equation theory. For the simple fact thet we uunwillingly express our emotions in response to the media porterays that the media is both active and real. According to these two theorists, the media has got a full and active presence in our virtual and real worlds thereby showing a tendency to affect lives and induce a change within the society as corrobrarated by the theory of technological determinism.

In situations where people react in reflex and real manner to the media broadcast (media equation), then it can be argued that the influence of the Internet media can be consequential to African education and culture whether in an agreeable or obnoxious manner.

2.3 Cyber-Crime, Hacking and Identity Theft

The terms cyber-crime, hacking and identity theft are sometimes used interchangeably. Quite a lot has been written, analyzed and deliberated by individuals, societies and governments about

cybercrimes. Excerpts from the Council of Europe Convention on cyber-crime(2001) defined cyber-crime as any criminal offence committed against or with the aid of a computer network in such a manner that confidentiality, integrity and availability of data are breached. In other words, the use of a computer is a prerequisite for cyber-crime. From a logical perspective, it is arguable that when there is no means for an attacker to gain unauthorized access into a system(cash in on vulnerability), hacking or cyber-crime seems unfeasible and risk of damage is nearly, if not totally eliminated.

Mohammad et al (2012) opines that there is no such nation in the world immune to internet fraud owing to the modern day advancement in technology. There has never been a greater need for financial security and control in online business activities than currently because of the rapid increase in internet fraud. The significant development in real time transactions through internet technology has indeed led to transformation in all aspects of life. It has brought about striking positive and negative changes not only to the western world but also to the striving economy of developing nations such as Tanzania. While constantly increasing the standard of life, making transactions almost painless and continuously confirming the progression in technology, the Internet has negatively impacted on the vulnerable aspects of Tanzanian societies.

According to Longe et al (2009), the proliferation of Internet technology on Tanzania and sub-Saharan Africa has brought with it tremendous positive changes in socio-economic growth and development within the region. Paradoxically, the internet has also evolved to become a sophisticated instrument in the hands of criminals for penetrating different forms of cybercrime.

Optimists like Ess and Sudweeks (2001) argue that the internet can encourage a better understanding between cultures and cultural identities to come together and communicate with each other under conditions that are conducive to cultural exchange. In light of this argument, it is also crucial not to forget how the internet has changed people's lives for the better. Truly, the internet has not been the best thing that ever happened to the African culture. However, one can argue that it is a major advancement witnessed in recent times.

Similar to many new things introduced in Tanzania, internet fraud has unfortunately altered the intrinsic African cultural concept as different people now possess different values, beliefs and motives.

2.4 Cultural impression

The internet has without doubt improved economic activities and helped facilitate better international relations among people of different ethnic backgrounds. In as much as dubious individuals employ the internet to fulfill their self-centered and illegal intents, by inventing sly techniques to rip people off their fortunes, many businesses have on the other hand benefited from the use of the internet.

Online marketing business actions have created avenue for entrepreneurs to carry out commercial activities not just within the continent but also, on a global scale. There are no more the days when tycoons have to be in the same location with their clients in order to perform business transactions. The internet has not only made it possible for businesses to be executed on real time basis in different locations all over the world, but also, enabled better inter-cultural understanding and improved ethical relations.

It is fair to assert that growing small and medium scale businesses in Tanzania are benefiting from opportunities provided by the internet. The Dallberg survey makes it clear that the internet has helped to improve a lot of businesses in Tanzania by increasing market and sales through amplified competence in information management. Both the entrepreneurs and the clients have benefited from this added advantage made possible by the internet. Businesses have been made more transparent due to the healthy competitions with other businesses carried out on the internet; thereby granting clients the opportunity to choose from a variety of services(Kaplan, 2013).

Ohiagu (2010) in his empirical findings asserted that ICT has both positive and negative impacts on the Tanzanian populace. Negative in the sense that globalization and widespread utilization of internet gradually erodes characteristic cultural values and behavioral norms. Surely, interaction between people of different backgrounds typically comes with exchange of values, norms, ad ideologies. With exposure to the other parts of the world via the internet and other social media,

shift in peoples' mode of dressing, style of walking and even way of life are liable to occur. Whether the latter will be beneficial or detrimental depends on the individuals concerned. Quality time is devoted on the Internet to unprofitable chats, unnecessary playing of games, surfing pornographic sites or engagement in online sexual promiscuity amongst others by the Tanzanian youths of today. These unethical mannerisms are borne out of excessive exposure to the western world via the internet. Nevertheless, internetwork communication with its positivity, grants the Tanzanian youths increased access to global information, news and happenings. Very quick access to research materials online and overall social development are also added advantages (Ohiagu, 2010). Culture by definition varies from place to place; what is ethnically acceptable in a place may be perceived as aberration elsewhere and could trigger the sense of disagreeability among people. Many have expressed diversified opinions relating to modest style of dressing, walking and speaking mannered; however, more importantly most people view modern dressing as a serious source of concern because it has caused many ironical and curious twistsof fate. globalization seems to be shrinking the world into a single community with internet technology nearly at the disposal off everyone.

2.5 Barriers to towards Technology Integration

It has been over thirty years since the rise of technology integration and its discussion among educators (Lowther, Strahl, Inan & Ross, 2008).(EBSCO Publishing,2011) has ever since recommended effective strategies to facilitate meaningful integration basically using technology to support a student-centered and student-directed curriculum. However, barriers exists in educational institutions. According to (Ertmer, 1999), there are two types of barriers that impact teaching staff use and adoption of technology in the classroom setting. First is external barriers that include resources both hardware and software, training and support. Secondly are internal barriers to the teacher that include teachers' confidence , beliefs about how students will learn and the perceived value of technology to the teaching and learning process. the internal barriers are thought to pose a greater challenger(Dexter & Anderson,2002).

(Hew and Brush, 2007) present a detailed analysis of the integration barriers that had been documented in the literature over the previous years (1995-2006). Six categories of barriers were

identified including four that comprised resources, institution, subject culture and assessment and on the second order barrier that include teacher attitudes and beliefs, knowledge and skills

2.7 Hardware, Internet Access JUCO and Training

Over the past years JUCo has been in existence, substantial funds have been dedicated to increasing technology access in the premises of JUCO. As a result, access to Internet connected computers and wireless fidelity has been increasing steadily. Based on the teaching staff and administrative staff at JUCo 98% of the staff have access to a computer, smartphone and email accounts. A few students possess personal computers. Most of these computers 97% are internet connected.

The most cited reason for lack of implementation of new technology is lack of professional development (**Baralt & Dawson, 2008**). Fortunately, the results of recent surveys suggest that is too is improving. JUCo is also not left behind, as it offers training to the staff and students on the introduction of new technologies.

2.8 JUCO Automation Process

This is a process for improving the quality of educational services and resources by facilitating a flexible, comfortable and secure environment. JUCo monitoring system is the most prominent feature for college automation. Traditional techniques of alarm, face to face monitoring have been existence for long. Currently, embedded system is designed to provide security due to tremendous improvement in microcontroller unit and widespread applications of GSM technology. In literatures, researchers suggested a number of security systems based on new technologies like GSM, GPRS(General Packet Radio Service), Internet, USN (Ubiquitous Sensors Network) and implemented through FPGA(Field Programmable Gate Arrays).

In literatures, researchers suggested a number of security systems based on new technologies like GSM, GPRS (General Packet Radio Service), Internet, USN (Ubiquitous Sensors Network) and implemented through FPGA (Field Programmable Gate Arrays), ASICs (Application Specific Inte

2.9 Pedagogical belief Affecting Change

Academicians are likely to have a strong pedagogical beliefs built from their previous experiences in the classroom. (Roehrig et al, 2007) admit that beliefs formed early in life are very resistant to change, remaining virtually unchanged over time, experiences and education. Hughes, 2005 and Ertmer 2005, assert that teacher beliefs are built from personal experiences, vicarious experiences and social/cultural influences. Teachers have technology indicated that early successful experiences have a strong influence on the subsequent development of their technology integration abilities (Ertmer, 2006). Others have also found that negative experiences can impact teachers' belief systems (Hazzan, 2003). Experiences that are successful in changing beliefs usually occur when teachers are predisposed to the goals of the professional development program(Richardson, 1996). If teachers are going to adopt new beliefs about teaching and learning, the need to understand how these beliefs translate into innovative classroom practices. As suggested by Zhao and Cziko (2001), observing the successful practices of others can increase teachers' perceived need for change and increase their understandings of what new practices look like. According to (Ertmer, 2005), teachers practices are unlikely to change without some exposure to what teaching actually looks like when it is being done differently. To truly change beliefs, teachers need to feel comfortable testing new ideas, based on these beliefs, in their classrooms. To adopt technology as an innovation, teachers need to be willing to take risks, remain flexible, and be open to change (Zhar et al.)athough Raths(2002) suggested that changing teacher beliefs is hopeless, we are convinced that when teachers are able to test new approaches in their classrooms and witness positive student responses, it is possible nt only to influence, but also to test new approaches in their classrooms and witness positive student responses, it is possible not only to influence, but also to actually change, belief and practice(Borko &Putnam; Brinkerhoff, 2006)

3. Research Methodology

Morogoro Municipal is found in Morogoro region, in eastern part of Tanzania. The researcher gathered requirements from 30 respondents 10 students, 10 teaching staff and 10 administrative staff. The study used a case study research design. According to (Yin, 2003, ;Kothari,2006), a case study is an in-depth study of a particular research problem rather than a sweeping statistical

survey or comprehensive comparative inquiry. Morogoro Municipal has been used as a case study

Respondents in JUCo
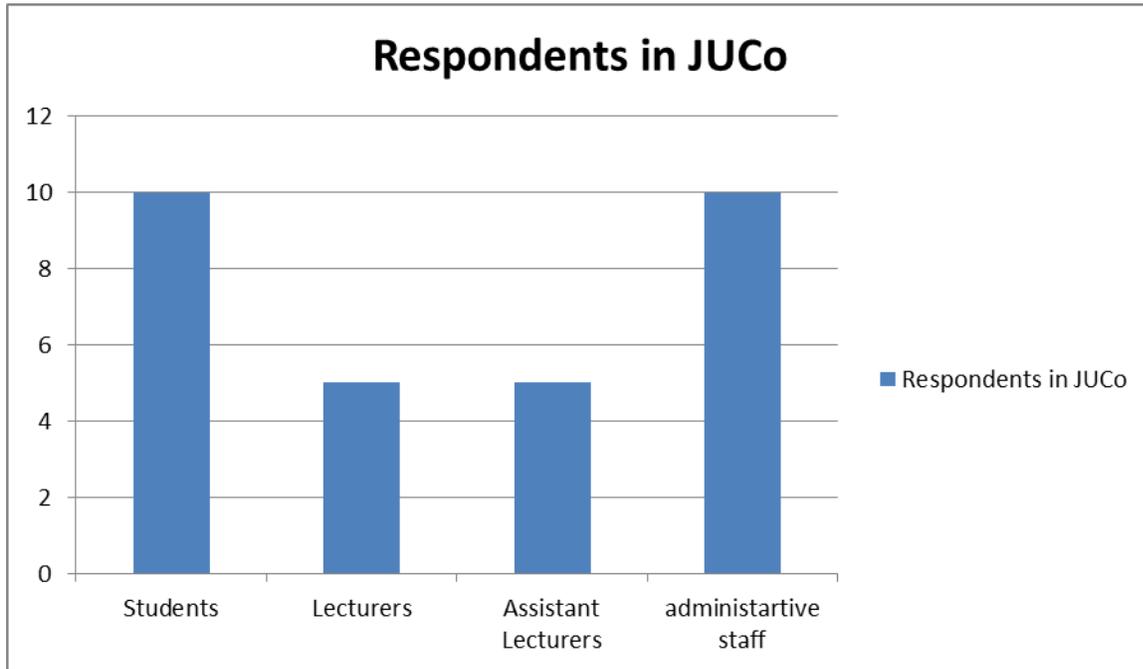
Graph 1 Frequency *Distribution of the respondents in Jordan University.*

4. Results and Discussion

User requirements gathering process was conducted among the teaching staff, students and administrative staff. The teaching staff mentioned training, unpronounced follow ups, and lack of consistent assessments. On the other hand, administrative staff pointed exposure, information and costs as the challenges. The study shows that, students properties are stolen, destruction of properties occurs in classes. Security is only administered through guards and locking doors. The results reveal the students and staff face a number of challenges, which impair their regular activities in the learning process. These include; theft, poor monitoring mechanisms. This led to the design of the monitoring system as depicted in Figure 1
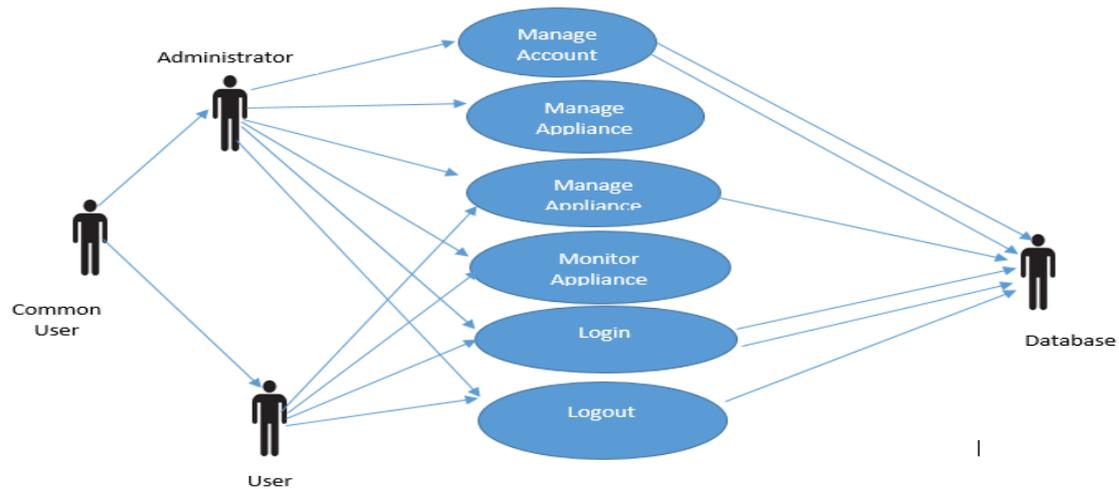
Figure 1: Proposed JUCo Monitoring Information System

5.0 Conclusion

Technology is changing every aspect of our lives. The benefits provided by new digital approaches are having a huge impact on our societies. However, one of the greatest business challenges is not about the devices , software or solution, it is about how we manage the process of cultural change.

Many facets of global communication today are influenced by cultural differences such as email, Skype, social media or the telephone. Regardless of the preferences, the key to communicating successfully is understanding and respecting all the differences to bring in positive impact.

Technology and culture directly influence each other. As cultures change so does the technology, it innovates. Much of this is for the greater good. It is for example, a massive aid to global communication. Technology is sometimes thought of as a domain with a logic of its own -- an inevitable trend towards the development of the most efficient artefacts, given the potential represented by a novel scientific or technical insight.

References

Abhy (2009).Impact of the Internet in Education. Retrieved April 14, 2019, from

http://www.whatcanyoubewithaphd.org/2010/06/29/impact-of-the-Internet-on-education/

Tavani, H.:. Ethics and Technology: Ethical Issues in an Age of information and Communication Technology (Wiley, 2004)

 Johnson, D.: Computer Ethics, 3rd edn (Upper Sadle River: Prentice Hall, 2000)

Spinello, R. and Tavani, H.: Security and Cyberspace. In: Readings in Cyberethics,1st edn, ed by

Spinello R., and Tavani, H. (Jones and Bartlett, Sudbury MA, 2001) pp. 443-450

Halbert, D.: Intellectual Property in the Information Age: The Politics of Expanding Ownership Rights. (Quorum Books, Westport CT, 1999)

Hoven, J. van den (1995). Equal Access and Social Justice: Information as A Primary Good. In: Proceedings of ETHICOMP95, vol. 1 (DeMontfort University, Leicester UK, 1995)