

Institutional e-Learning Sustainability for Rural Settings

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Abstract—Information and Communication Technology (ICT) will lie at the heart of business model for next century or more. The role played by ICT in changing and shaping tomorrow's business operations is a distinctive one and cannot be over emphasized. E-Learning is re-defining classroom teaching and learning to extent its scope, boundaries and pedagogy. We normally hear arguments on instructional technology and e-learning being the key focus of educational policies and qualities as we embark slowly but steadily into the millennium with little or no mention on how to sustain innovations and development. We are of the opinion that e-learning sustainability deserves more roles and attention as the basis for e-learning. There is no point in implementing e-learning only to find out that the momentum and gains cannot be sustained or endured over time. We believe the whole exercise would have been a wasted one – an exercise in futility. Whereas, sustaining e-learning in the rural world is likely to present more challenges. This paper will look into the issue of e-learning sustainability and the challenges it poses for future teaching and learning using a qualitative research and interpretive research approach in the rural world. The paper will contribute in helping to create awareness to the salient point of e-learning evolution that has been rendered to the backdrop as a prominent factor in evaluating e-learning implementation beyond the present to a future instructional offering taking cognizance of the numerous challenges and constraints in the rural world.

Index Terms—e-learning, e-learning implementation, e-learning sustainability, Information and Communication Technology (ICT), Instructional offering.

I. INTRODUCTION

Almost immediately after the post-apartheid state in South Africa, there have been ever increasing changes in the composition of the students population in higher education. The government's total commitment to quality, transparent education and recently, "access with success" education initiative have been the driving force for an unprecedented

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yearning and calls for greater push for flexible delivery of courses. There were calls for the kind of education that transcend beyond geographical boundaries, race, color and gender. Nonetheless, there was a consistent call for the kind of education that offers flexible course delivery, convenience in studying, greater participation, global opportunities, high degree of collaboration and above all gives the student opportunity on course selection. Since educators first began to use computers in the classroom, researchers have tried to evaluate whether the use of educational technology has a significant and reliable impact on the student achievement. Evidence has shown that when used effectively, "technology applications can support higher order thinking by engaging students in authentic, complex task within collaborative learning contexts" [24], [33].

Recently, "education" has risen to the charts in public opinion polls in our country. A growing number of on-going state and local government election campaign were waged almost entirely on the back of "educational reform." As a result, state and local authorities are now vigorously experimenting with innovative educational programs from availability to streamlining to standardization to merging and e-learning options. The growth in computer applications and the use of Internet in particular have signaled change for the delivery of education especially in the area of teaching and learning. We argue that the growth of the World Wide Web – the Web, combined with rapid technological advances in computing power, networking, communication and storage technologies is paving the way for a new trend in teaching and learning in the form of e-learning, web-based education and distance education respectively as against the formal traditional classroom education [27], [29].

Before the dawn of first Republic, most schools across the country and their governing councils were devising and implementing technology plans by investing Millions of Rands in computers, and ICTs. In particular, educators have realized that computer networking offers flexible and powerful new ways to accomplish a range of goals that have been long important and resourceful in schools, such as gaining access to universal information resources and ultimately improve on education quality. We note with grave concern that the efforts were purely on buying computers and communication technologies without clear resolution and considerations for sustaining the projects beyond initial takeoff. Arguably, the use of these models in our classrooms is a major development that is changing the way knowledge is imparted to the student inside and outside the classroom.

Means and Olson, [25] observed that researchers are now beginning to meet more complicated research tasks of

investigating the impact of technology usage in meeting these new expectations of what the student should learn and how to go about learning it. We argue that while so much attention is being paid to the matter of educational outcomes, opportunities and equity is undoubtedly a good thing. But the most unfortunate of these efforts is, as growing number of people turn their attention to these matters, a seemingly intractable debate ensued over what good education is really about: test scores, “back to basics” and choice? We instantly queried sustainability! Rosenberg [29] observed that many of the debates on education and instructional model have missed the point by a wide mark. She argued that more attention should be focused on exploring the value and impact of education’s new instructional delivery.

Without doubt, these technological innovations in education are profoundly influencing traditional university practices and policies and may even be fundamentally altering our conceptualizations of education both in the short and long run. But when there are no plans to sustain these e-learning investments, disruption to academic teaching and learning is imminent and the resultant effects may be catastrophe. The situation may be a worst case scenario and devastating in rural school. The future e-learning education and applications that automatically recognize a user’s learning style preference and deliver the content using text, audio or visual format to the extent of its scope, boundaries, and pedagogy in order to optimize and personalize the learning experience will be completely jeopardized without any sustainability plans. This in turn leads us to our research question:

How can we sustain our e-learning education, its standard and qualities beyond the present states of accolade to fulfill and delivered its promises well into the future and beyond?

Hence the main effort of this research is to take a closer look into e-learning implementation as of the new generation of tools for teaching and learning and evaluate the level of our plans to sustain the project at its immediate present into the nearest future and beyond. Furthermore and towards answering our research question, the following section II will highlight and present the details of e-learning, the benefits thereof, the advantages and disadvantages of e-learning and the future e-learning education in our institutions. Section III will discuss the strategies for e-learning sustainability, evaluate and shed more light on the requirements for evaluating e-learning sustainability in our rural area. Finally, section 4 will conclude the study. This section will make informed conclusion and recommendations on the state of our e-learning implementation and its sustainability.

II. LITERATURE REVIEW

In most contact based or traditional education, the lecturer is charged with presentation of lectures, development of curriculum, development and printing of learning material (study guides), development of tutorials and practical etc. Although most learning takes place outside of the classroom, most of the time spent as a learner has probably been in a “traditional” classroom. Traditional

classroom learning or contact based education is often focused on the instructor with information tending to flow from the instructor or lecturer in most cases to the student and as a result the atmosphere may be more passive for the students. With the ever changing composition of the student population in higher education coupled with the government’s total commitment to quality and transparent education, the mandate is for educational institutes and administrators to explore the possibilities of adopting a new method of instructional offering that offers more responsive and flexible ways of teaching and learning.

Over the years, e-learning, computer-based training and learning, web-based training and learning, distributed learning, distance education, on-line education initiatives were creating a stir in the corporate world and are becoming such a force to be reckoned with by recording a substantial growth in the education and training especially in traditional classroom teaching and learning. E-learning can be defined as a learning which takes place as a result of experiences and interaction in an Internet environment. It infers that this model of learning is not restricted and confined to a regular school day and may take place at a variety of locations including home, school and community locations like libraries, internet cafes e.t.c. Learning in this case, is not is not bound by space and time [10], [17]. We believe it is worth noting that e-learning can cater for all types of educational needs, environment and more importantly, the individual learning needs. It is affecting the educational establishments, teachers/lecturers, pupils/students in higher or tertiary education and not forgetting the adult learners. Hence, it implied from all indications and justification that, it’s not an over emphasis to infer that e-learning will have great significant and well pronounced impact on teaching methods and instructional delivery.

Education is the foundation for any modern society as argued by many Educationist and world leaders, e-learning in our opinion can be inferred as the next evolutionary step. The spirit of innovation and participation has been the major driving force behind most exploration of range of opportunities and possibilities of Internet technology in education. This enthusiasm has never for one time stopped or seem like an end is near, because with each passing time, people are becoming more interested and absorbed by the teaching and learning potential of e-learning. Therefore, it could be argued and stressed that the possibilities and vision of e-education is becoming stronger with a clear need for e-learning strategies that will complement the Information and Communication Technology (ICT) of the future.

From an academic point of view, offering a course on-line in a formal classroom environment raises challenging new issues regarding intellectual property, pedagogical rigor and methods, course management, lack of equipment and support. Some of these issues have been tackled to some extent, whereas others have been fine-tuned while the others are receiving a great attention. E-learning and its technologies introduce new and sometimes subtle challenges that must be addressed. Our concern at this stage is the challenges posed by issue of sustainability. We argue that there is a great deal to be gained in fostering e-learning beyond its present day gains into the future. There is no wisdom in embarking on capital intensive project like e-learning only to fall apart in the nearest future. This could be miss-leading and could attract irrepressible loss in

monetary terms and disruptive education programme [11], [21].

III. E-LEARNING SUSTAINABILITY

Today's ICT solutions or service providers are facing a series of complex challenges ever in trying to meet up with the requirements of building or enhancing enterprise ICT solutions to many facets of organizational problems and at the same time sustaining the proffered solution amidst the quest to maximizing profits and remaining competitive at the same time. Bakos and Treacy [4] argue that, although the use of ICT as a competitive weapon has become a popular niche; it is still marked with lack of understanding of the issues that determine the influence of Information Technology on a particular organization and the process that will allow smooth coordination of the technology and the corporate strategy beyond the present day's dispensation to continuous potentiality of the future. In most cases, projects always exceed their schedule or budgets. Many studies have shown that most ICT projects have failed for reasons, ranging from poor project planning, inadequate project requirements, weak business case, lack of commitment and support from management, unwritten quality plans, inappropriate business model or framework and some have failed for a simple reason of not putting a plan in place to sustain the project beyond initial momentum and present success for the challenges of the future. Others have failed due to a host of other reasons numerous to be listed but to mention just a few [1]-[3], [29], [19], [15].

The rural world presents more sustainability challenges. Many authors and e-learning enthusiast have tried to document their numerous concerns and recommendations through various assessment and impact evaluation [26], [23], [29]-[32], [18], [19]. Attwell et al [3] considered five main areas of learning platform and software, institutional supports, e-learning materials and development, pedagogical consideration, teachers and trainers skills as central factors to e-learning sustainability. Billig [6] professes that strong leadership, availability of strong infrastructure and organization development, good support structures, good incentives, visibility, credibility, strong and mutual beneficial partnership, macro culture and sufficient funds as some of the major initiatives that enhance e-learning sustainability. Cisler [12]) professes enabling ICT sustainability on four different components using economics, social, political and technological sustainability. Their respective efforts in different and pervasive e-learning challenges have been contributory factors in fashioning our sustainability directions and assessment as Financial support sustainability, Stakeholders sustainability, Social and Political sustainability, Technological sustainability, Security sustainability, Energy sustainability, Internet connection sustainability, Content development and management sustainability, Training sustainability and Best practice sustainability

A. Financial Support Sustainability

Implementing e-learning is a capital intensive investment. It comes high at the expense of other budgeting factors. Because the aim of sustainability is to endure the gains of e-learning over long period of time, it is pertinent that the

budget allocation must be able to finance the project needs through the budgeting period. Challenging any financial implication for present and on-going cost right from the onset will go a long way in our quest to ensure that e-learning financially sustainability is guaranteed. We will recommend a continuous budget provisions that will be well enough to cater for immediate and contingency needs of e-learning technology throughout the life span. Equally, further efforts should be directed in seeking funding from corporate or private sponsorship to supplement the budget provision.

B. Stakeholders Sustainability

The stakeholders in institutional e-learning implementation include management staffs, lecturers, students and the immediate community. In our opinion, all stakeholders have vital role to play to fortify e-learning sustainability. We demand that each stakeholder play shared strong leadership role with uncompromised vision in their respective domains. The management should provide leadership in drafting enduring e-learning implementation policy and review, provide appropriate fiscal support and encourage favorably atmosphere that ensure e-learning sustainability. The lecturers should provide leadership in e-learning management and utilization. They are expected to device plans and strategies that will encourage optimal use of e-learning technology, facilitate content development and ensure best practices. The students should provide leadership by participating fully in e-learning and possibly register some on-line course. The community has been included because they stand to benefit or lose out directly or indirectly for success or failure of e-learning in their community. They should provide strong leadership that will ensure continuity of e-learning implementation in their midst, surely the benefits and gains significantly out weight its non-existent.

C. Social and Political Sustainability

No doubt our cultural, social and political affiliation sometimes influences our decision. Most institutions' decision making mechanism involves more than one person hence we expect a great deal of interpersonal influence to impact on the decision especially when it involves multiple departments and units each with their own goal, objectives, standards, procedures and agendas [22]. A situation where a decision making process becomes bargaining power and highly politicized will not augur well for e-learning sustainability. Equally, institution change resistance culture will either make or mar e-learning sustainability. An institutions' decision forum where issues are deliberated based on their merit will flourish e-learning sustainability. Otherwise, we recommend good conflict resolution and bargain to resolve and reconcile the different goal to a single decision that will endure e-learning implementation.

D. Technological Sustainability

E-learning is dynamic and evolving over the years, it seems like the end is not near. The technological sustainability must not be determined by the ability to purchase the required technology but rather the ability to maintain, keep it up and running with minimum down time.

Also our choice of technology should not be too “flamboyant” – don’t forget vendors will say anything to sell their products, but we should go for the technology that have been tested, meet our immediate requirement, that have the capacity and the robustness scalability over time. We propose that there must be budget provision that support this noble cause of ensuring continuous maintenance to reduce down time. There must be capacity for technology updates and renewal to support e-learning sustainability.

E. Security Sustainability

One of the major concerns of any e-learning installation is the security issues. In order to sustain e-learning, efforts should be made to protect the data against any form of misuse, intention/unintentional loss of data, sabotage, destruction, the effect of natural disaster, theft, fraud, electronic infection – viruses, unauthorized access and modification of data [28]. All of these present more concerns and challenges in the rural settings. The seriousness of e-learning sustainability prefers that we don’t comprise any form of threat or security issues. The list of threats is not limited to the above, efforts must be made to sustain e-learning implementation by protecting data through user authentication, user-defined policies and procedures, backup and recoveries strategies, installation of antivirus software and firewalls. Theft has been our major concern in the past. In the wake of country wide local service delivery protest, sabotage, vandalism and looting of properties are high on the rampage. We strongly recommend 24hoursX365days physical security and protection for the site which we agreed comes with extra budget requirement but we are saying there must be budget provision for it and may not be an over sight in our quest for e-learning sustainability.

F. Energy Sustainability

The highlights of recent service delivery protest revealed citizens are not happy about the state of affairs of most basic amenities for rural areas. Prominent on their list of demands is stable source of energy. Prior to this campaign, electricity are intermittently switched off and sometimes it take days before it is available again. Sustaining e-learning depends highly on availability of power. Alternative power source like standby electricity power generator must be provided in case the normal power source is erratic. We noted with concerns that high power surge now and then could damage systems which is not good news to our efforts on sustainable e-learning. At the same time, the alternative energy sources come at a high price for our budget through cost of maintenance and fuelling, etc; but because e-learning sustainability is high on our agenda, we recommend that institution walks the extra mile to ensure and make provision for stable source of energy in order to endure e-learning at any expense.

G. Internet Connection Sustainability

In the rural setup, like energy supply, internet connectivity may be intermittently supplied. This is a critical success factor and the basic for e-learning. There will be no mention of e-learning implementation when we cannot adequately guarantee the connectivity or its

sustainability. There are various ways to connect onto the internet notably broadband, dial-up, ADSL, LAN, wireless, fiber optics, satellite and the list could continue with varied technologies and options. We strongly advise that the choice of the technology must depend on the circumstances and challenges posed to e-learning implementation and sustainability in the rural area. We recommend durable, high speed connectivity, efficient and effective technologies that lend itself low maintenance cost.

H. Content Development and Management Sustainability

E-learning is in forefront of transforming education and opportunities around the world by allowing immediate access to global repository of information, different kind of interaction and innovation among various educational institutes and students alike all participating in the global online innovations. This phenomenon is affecting our teaching and learning to its pedagogy. It is redefining the way teaching and learning is impacted to the students beyond its scope, time, boundaries and contents [20], [14]. Developing and maintaining the content have raised some challenges like lack of standards, cost of multimedia learning materials, language and localization, social and cultural issues, copyright and plagiarism issues. However there are numerous efforts to address these concerns through open standards, reusability, learning object, content repository, license and copyright, open content etc. [16], [8], [13]. In addition to these efforts and toward e-learning sustainability we recommend the appointment of permanent curriculum and content specialist that could assist in day-to day content preparation and review to alleviate and supplement lecturer efforts.

I. Training Sustainability

In most traditional classroom education, the lecturer is charged with presentation of lectures, development of curriculum, development and printing of learning material (study guides), development of tutorials and practical etc. We argue that technology doesn’t teach or train people by itself; it is the people who teach and train other people using technology as a perfect educational delivery tool. A vital point towards e-learning sustainability it to invest in teachers capacity building that will equip the teachers with valuable technological skills, knowledge and understanding on how to integrate technology with the new pedagogical approach. Continuous training and professional development fosters personal development, exploration and improvement of professional practice, create new knowledge, ability to transfer skills, knowledge and understanding from one context to another, generation of expertise through research and further development of communication skills. These are the key toward e-learning sustainability [2].

J. Best Practices Sustainability

Education is a valuable investment in its own right. ICT through e-learning have turned it into an exciting new industry, complete with challenges and opportunities that accompany opening of any new frontier. E-learning is making a new wave in education especially in teaching and learning and making education-on-demand a reality that will

enjoy full benefit of economy of scale which will in turn lead to lower education price, better services through affordability, remove boundaries, greater access to resources and increased competition. No doubt, the rapid development and adoption of e-learning offers exciting new vistas in the delivery of educational and instructional material [5], [21], [7]. It is very important and in the interest of e-learning sustainability that we devise a comprehensive list of best practices and from time to time benchmark our practices with international standards. It is desirable for us to be able to know what practice works, what practice does not work and what practice we need to improve on. Most importantly, we must embrace a wider community of practices, foster cooperation and collaboration in research as a guide for our policy, action and professional practice [2].

IV. CONCLUSION

E-learning as a new innovation in teaching and learning is taking the world by storm with new initiatives and activities that are superior in many important ways over the previous method of teaching and learning to create long lasting innovations in the society. This means that the classroom is now a “virtual learning environment” in which learning is no longer bound by space and time. Hence teachers may merely post their syllabi or course outline on the Learning Management System, this has radically changed the whole scenario about method of teaching and learning whereby the class venue for teacher and the students alike has been shifted to the computer. No doubt, e-learning has gathered enough momentum as a force to be reckoned with as a future instructional mode but certainly, all these have come with some concerns, uncertainties and skepticisms notably around pedagogy and e-learning, generation of e-learning materials and contents, access to hardware and networks, interoperability and redundancy, e-learning burdens and cost, continuous training and skills development. Adequate e-learning sustainability plans and mitigation will be a major factor in determining the future e-learning in our institution

The whole idea of e-learning sustainability call is aimed at giving a profound supports and uncompromised efforts that will continuously maintain e-learning as the fastest growing education teaching and learning alternative and viable instructional offering model. The aim is to ensure we are able to keep the progress made by new reforms and activities of the nature, complexities and dynamics like e-learning going well into the future. It emphasizes the capabilities of equitably meeting the need of present e-learning challenges without compromising the needs of the future. E-learning sustainability efforts explore those possible ways of enduring the gains of e-learning implementation over time in the face of numerous challenges its presents to our teaching and learning. Providing for e-learning sustainability plans may yield a valuable return on investment, may prevent possible disruption to our education and pedagogy, it will enable management to scale up their planning and be innovative in their e-learning provisions, create strong and enduring partnership in generating funds and security over time.

We are proposing that e-learning sustainability plans should be on the agendas right from the start of the project

and may be on-going with possibilities of re-evaluation as the challenges or threat to sustainability emerges. The rural setting presents more e-learning challenges because of their peculiar problems and requirements that in our opinion require peculiar solutions. We strongly advise viable leadership in the provision of durable physical security presence to guard against theft, sabotage, vandalism and looting of our equipment. One of the pillars of sustainability is the ability to fund and support the projects financially. Institutions should in addition to budget provisions endeavor to source for additional financial sustainability measures through enduring partnerships and sponsorship. Another key factor in enduring e-learning sustainability in the rural area is in the area of sustainable energy. Efforts should be made for alternative source of energy. We further recommend the use of uninterruptable power supply on the equipment to effectively cater for time lag between power failure and time to allow for normal power down of the system otherwise automatic power generator will be of best interest to us and are highly recommended. Finally, our model will adequately fit in the urban or metropolitan e-learning sustainability.

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