

## **BARRIERS AND CONSTRAINTS TO EPISTEMOLOGICAL ACCESS TO ONLINE LEARNING IN MOZAMBIQUE SCHOOLS**

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### **Abstract**

While global corporations and western governments have subtly and systematically peddled the utopia and hype about the capacity of information and communication technologies (ICTs) to radically transform learning and pedagogy and African governments have unquestionably acquiesced with hefty investments in ICTs the education sector, few academics and policy makers have ever questioned and taken stock of the contribution of technology to online learning. More importantly, the heavy investments in ICTs infrastructure modeled along Western ICTs hubs have been parachuted without sufficient contextualisation to suit the structural realities of resource-constrained environments. Moreover, hardly have interventions been aligned with academics and learners' extent of e-readiness and ICT literacy levels to ensure effective appropriation, adaptation and sustained use of ICTs. Drawing on African examples and Mozambican education system as a case study, we demonstrate the complexities and subtle nuances of consolidating ICTs access for teaching and learning in an environment riddled by abject poverty, weak erratic power supply, underdeveloped ICTs architecture and cultural barriers that undermine certain societal groups' access to ICTs. We argue that the institution of a robust ICT architecture at national and institutional levels should be constructively aligned with its grassroots implementation (at institutional levels) to foster epistemological access to ICTs, the development of 'best practices' of pedagogy and a culturally responsive, knowledge rich environments. We further argue that ICTs should become bridging zones for the integration and alignment of community based knowledge (tacit, personal knowledge) and institutional (school) knowledge through

creating liberal spaces for their experimentation with different forms of knowledge (Rambe forthcoming).

### **Key Words**

Epistemological access, conditions of access, digital divide, communicative possibilities, digital literacy, online learning, Mozambique

### **Introduction**

The ICTs<sup>i</sup> protagonists have relentlessly championed Information and Communication Technologies (ICTs) as indispensable catalysts for fostering online learning and African development in general without critically reflecting on and taking stock of the deep seated structural constraints (poverty, digital divide and hefty economic investments), ideological and political motivations that accompany ICT adoption and use in resource constrained learning environments (Federal Republic of Nigeria National Policy on Education 2004, Goshit, 2006, SchoolsNet Africa 2009). Unsurprisingly, several studies on ICTs in schools and universities evolve and are guided by the assumptions that increasing access to ICTs particularly computers, will inevitably scale up access to information and accelerate the production of knowledge (Apple Inc n.d., Licoppe and Heurtin, 2001). This understanding has been accentuated by the role of the Internet and the World Wide Web in ‘democratizing’ the production, dissemination and access to information. The interventions at national and educational institution levels have been guided by the unsubstantiated assumption that increasing the ICT infrastructure (internet and communication networks, computers, electricity supply) will automatically improve student ICT literacy without paying sufficient attention to other structural constraints that hinder access like the ICT skills gaps of academic staff and students, socio-cultural barriers like negative perceptions towards pedagogical use of ICT and student limited communicative competencies.

A handful of scholars have questioned the rhetoric ICTs to exclusively revolutionize knowledge production, and the extent to which Africa can gravitate towards becoming a knowledge society through uncritical adoption of technology (Van Audenhove 2003;

Guri-Rosenblit 2005, Britz et al 2006, Njenga and Fourie 2010). Van Audenhove (2003) contends that while the information society should target education, recent development trends have dangerously focused on information technology to the detriment of the education. Acknowledging the critical role of cultivating the competencies and skills of the learner, Guri-Rosenblit (2005) suggests that abundant information access through the Internet does not turn automatically into meaningful knowledge without the assistance of a teacher or an expert. We argue that the students need to develop a unique repertoire of skills, disciplinary language and intellectual competences that allow them to effectively deploy technology for the accomplishment of academic tasks. Njenga and Fourie (2010) propose that technopositivist ideology has denied educators and educational researchers the much needed opportunities to explore the motives, power, rewards and sanctions of information and communication technologies (ICTs), as well as time to study the impacts of the new technologies on learning and teaching. They elaborate that much of the focus is on the actual educational technology as it advances, rather than its educational functions or the effects it has on the functions of teaching and learning (Ibid). Drawing on Mozambican schools as a case study, we argue that student enhanced physical and 'epistemological access' to ICTs are critical to effective socio-situated use and contextualized adaptation of educational technologies.

### **Literature Review**

ICT and information literacy have become central practices in student effective progression and academic performance in secondary and university education in Africa. Skills such as bookkeeping, clerical and administrative work, stocktaking, now constitute a set of computerised practices that form the core information technology (IT) skills package: spreadsheets, word processors, and databases (Reffell and Whitworth, 2002). To demonstrate the importance of ICT skills acquisition, Adomi and Kpangban (2010) emphasise that the Federal Republic of Nigeria's National Policy on Education promulgated in 2004 espouses that at the junior secondary school, computer education has been made a pre-vocational elective, and is a vocational elective at the senior secondary school. It is also the intention of Nigerian government to provide necessary infrastructure and training for the integration of ICTs in the secondary school system. This emphasis on

the development of infrastructural backbone has targeted development of internet networks for example, Schools Net initiative and development of the heavy infrastructural architecture in particular the provision of electrical power, and heavy capitalisation projects like acquisition and installation of computers. The removal of structural barriers to ICT access at institutional levels like computer skills, upgrading of teachers, shifting of teachers' perceptions about the contribution of computers to teaching, continual upgrading of the processing capacity of computers, students ICT literacy skills enhancement have often been downplayed or ignored. That said, internet adoption and access in Africa is low. And Africa has a limited number of countries that have subscribed to broadband.

While the Internet constitutes the foundation of new establishments around the world with its features of being a rich data bank, having a broad expansion area, having a rapid update speed, allowing interaction and facilitating easy information transfer (Akinoglu 2009), critical questions should be asked on the extent of impact it will have on Africa given the incremental penetration rate and uptake. Norris (2000) attributes Africa's limited uptake of the ICTs and the Internet to abject poverty which has various manifestations-Gross Domestic Product (GDP), illiteracy, poor and expensive or non-existing infrastructures that support ICT. Notwithstanding the high ideals and promises of the internet with regards personalisation of learning, free access to huge volumes of information instantaneously, possibilities for manipulation of content peddled by the Western governments and Internet advocates, there are several barriers to access internet and ICTs in African schools like slow rate of connectivity, limited bandwidth that constrain the downloading of long documents and files which frustrate the effective use of computers for learning.

Zacchetti (2009) suggests that access to the Internet is heralded for its affordances to nurture media literacy which "empower [learners] through critical thinking and creative problem-solving skills to make them informed consumers and producers of information" (p.21). The democratisation of access through the internet permits students and academics to strategically choose chunks of information from different sites for adaption, manipulation and application in diverse contexts of their choice. The internet affords

mobile and lifelong learning by presenting opportunities for anywhere any time learning and using any technological device of students choice (for example social networking sites, blogs, RSS feeds, wikis, digital libraries, and podcasts). These technological affordances have led Akinoglu (2009) to argue that internet users are free from the repressive and authoritarian environment of some on-site formal education systems which is sometimes boring for the learner and which can put the learner off accessing information. The above mentioned claims about democratisation of access need qualification and contextualisation. These affordances are frustrated by the slow internet access, the obsolescence of computers and ICT equipment used in many African schools. For example, Kabonoki's (2008) study of student-teachers at the University of Botswana reports that marginal, institutionally based access to computers by these students is a concern and poses a challenge that is double-sided. They need to gain access and confidence in the use of computers and other ICTs (for example, MP3 players) and access institution based and not personally based as often suggested by western literature. Students in Africa spend large amounts of time walking to the Internet cafe (Africa Higher Education, 2007) where they go in a bid to cut on transport costs to the main campuses and they pay high tariffs to café operators as they cannot travel to campuses to access. The hype about personalisation of learning and free choice is constrained in cafes where extent of access to ICTs is limited and the manipulation and synthesis of information on websites is frustrated by the slow internet connectivity rates.

### **Conceptualizing access to ICTs in education**

#### **Formal access**

Online learning can be a function of the functional access to ICTs for teaching (by teachers) and learning (by students). Morrow (1993) makes a formal distinction between two forms of access- formal access and epistemological access. Formal access concerns registration at the institution where emphasis is on entry qualifications, student fees and access to financial resources and the physical location of the institution. In relation to formal access, Lubisi (2005) employs the term physical access which emphasizes addressing the barriers that limit the ability of learners to physically locate themselves in

an institution of learning. He identifies them as ranging from immovables, through learning support materials, to direct costs associated with attending school, college or ABET institution.

In an online learning environment formal access could involve physical access and conditions of access to ICTs in school environment. These encapsulate proximity to and ease of access to the computer laboratories, computer laboratories' hours of operation, rules of access to computers (like booking requirements and their congruence with student free periods), the quantity and quality of technical support rendered in these laboratories by laboratory assistants) and the computer-student ratios. Access may also include human computer interface issues like log on requirements, bandwidth issues, easiness and extent of internet connectivity which can be limited in African environments characterized by the digital divide. Epistemological access relates to students acquisition of the discursive, linguistic and textual practices of the discipline that afford them the capacity and ability to effectively function and successfully perform academically in their specific disciplines. We will explain epistemological access more, as it constitutes the gist of this academic work.

Another perspective of constructing access is to foreground it in barriers to effective immersion to university practices and values. Cross (1981) differentiates three barriers to accessing formal education for adults, namely, situational barriers arising as a result of the learner's social situation-like domestic responsibilities, work-related commitments and transport problems. The other is institutional barriers that relate to entry qualifications, physical location of the learning institution and learning schedule. Given the virtual nature of online learning environment, the conception of access twists in another direction from spatial location of the space towards the affordances and constraints of the virtual learning environment. The last variant of access Cross (1981) postulates is dispositional barriers that relate to the individual's academic disposition like epistemological beliefs, values and perceptions of learning, motivations and past experiences. This last category of access approximates Morrow's (1993) conception of

epistemological access, as it is anchored in the fostering a pragmatic fit between institutional values and personal epistemological orientations.

### **Epistemological access**

Upon securing formal access, Morrow (1993) suggests, students need to engage with knowledge of the academic programme for which they have registered. This process of initiation into the discourses and practices of the discipline is what Morrow terms epistemological access (Morrow 1993 cited in Holtman, Julie, Mikalsen, Mtetwa, & Ogunniyi 2008). Morrow and King (1998) emphasize that the challenge of epistemological access is the task of enabling students to become participants in and users of a shared disciplinary practice initially beyond their reach. Teachers need to help students acquire the language of (the grammar, image, rules and logic) of the specialist practice. As such, effective teaching embraces the induction of students into a specialist discourse which constitute broadening epistemological access (Ibid, p. 207-208). We interpret that epistemological access in an online learning does not only include apprenticing and inducting students into the modes of conceptualization for the discipline but also affording them the ICT language and practices of their field. This could include the ability to interpret, analyze, synthesise/annotate and manipulate different forms of text (textual information, graphs, pictures, visuals) encoded as ICT language to enable students to effectively solve academic problems, questions, issues and debates in their discipline. Discourses are critical to epistemological access because “values and attitudes and the practices that a language user needs to draw on all relate to what can count as knowledge and the ways in which we make that knowledge” (Boughy 2008: p. 6). As such, epistemological access is not just about possessing the knowledge, but knowing how to make it (Ibid).

## **Barriers to online learning in Africa**

### **Economic factors**

Literacy levels and skewed internet access

E-Learning Africa portal (2009) cites Executive Director of School NetAfrica, Ms Shafika Isaacs, who laments that Africa lags behind targets of the Education for All goals of universal primary education with an estimated 43 million young people of school going age not having access to formal education. She further points out that if access to basic ICTs inclusion is a basic indicator of digital age inclusion, then Africa had 27,000 schools out of an estimated total of 600 000 schools with the most basic access to computers, and this did not always include access to internet connectivity.

The related challenge is the utopian belief that increasing the number of computers automatically shifts the online learning trajectory and upgrade ICT literacy of teachers and students. This unsubstantiated assumption is visible in the attempt by International organizations that emphasise digital literacy enhancement like SchoolNet Africa that conceive PCs and internet connectivity as the best interventions for leapfrogging Africa's knowledge development and literacy. For example, in 2009, this organization's Campaign for One Million PCs was premised on the gender mainstreaming assumption that PCs reach teachers in their homes as the vast majority of African teachers are women, and providing them access to PCs for use in their homes allows women teachers who have been socialized to be technophobic to overcome their phobia for technologies. This assumption is premised on the unrealistic assumption that these teachers would use the computers, had the requisite training and experience to effectively appropriate them, and that they had ample time to use them at home after work.

Prof. Thomson Sinkala, the Head of eLearning of Southern African Network for Training and Research on the Environment (SANTREN) suggests that Internet has the highest potential to help Africa leap frog in its development through eGovernment, eHealth,



eLearning, eBusiness/Commerce, and Voice over Internet (VOIP). The argument was that this technology best suited resource constrained environments where there were poor physical infrastructure linking remote parts of countries and in the wake of inadequate investments in the infrastructure for basic services in Africa. This optimistic argument seems not to account for other structural barriers to the Internet connectivity like the unreliability of the internet in many African states and the bandwidth problems that constrain the access to information and downloading of useful educational resources.

Czerniewicz et al (2007) suggests that in South Africa, the spread of Internet connectivity is constrained by a poor communication infrastructure, inadequate and unreliable electricity and telephone networks and high telecommunication costs. The cost of dial-up services is a significant factor limiting the use of the Internet and while it is widely known that dial-up access in Africa is costly in comparison to developing countries, in general, dial-up access remains relatively expensive in South Africa.

### **Skewed national budgets for ICT infrastructure**

According to a UNECA survey on ICT expenditure in national budgets undertaken in April 2005, Botswana, Lesotho, and South Africa have shown a consistently higher increment from 2003. The 2005 allocations represent 0.28 per cent of the total budget in South Africa, 1.27 per cent in Botswana, and 1.47 per cent in Lesotho (E-learning Africa portal 2009)). Despite this increasing visibility of recurrent expenditure devoted to ICT infrastructure, these financial injections are insignificant in light of the heavy investment that need to be devoted to their fragmented ICT architecture or when compared to other sectors like Health or Education. When this translates into the basic ICT infrastructure in schools, notwithstanding the variations that obtain depending on the schools' resource base, academic history and management, translates into minute budgetary allocations that are insignificant for majority of impoverished schools.

Dzvimbo (2009) commenting on Africa Virtual University where he was the Rector suggests that access to affordable and reliable internet connections is a problem prevalent in all African countries. Most educational institutions on the continent are unable to buy

sufficient bandwidth to support the educational, research, and administrative needs of students and faculties. This adversely affects delivery and teaching using Open Distance and eLearning methodologies that rely on a high-speed campus backbone.

## **Social-cultural barriers**

### **Gender divide**

The different ways in which males and females are socially constructed in their contexts shape the ways these social groups interact with ICTs. For example, Ramachandran, (2000) reflecting on how unequal gender relations manifest in India suggests that women's work is either undervalued or dismissed outright, women are portrayed as being weak and dependent on men, and their physical mobility is limited leading to reinforcement of a very low self-image. Although entrenched socio-cultural stereotypes that conceive women as naturally technophobic are increasingly challenged as girl child excel in science and technology fields and with their increased access to the Internet, these culturally based gender stereotypes are sometimes reinforced in school management, ICT centre management structures that have overarching male dominance. To exacerbate the situation, the gender disparities in enrolments in Science and Technology fields further militate against female participation in these fields.

E-Learning Africa (2009) cites Shafika Isaacs who highlights the gendered nature of issues of connectivity, capacity building, education content development or issues of policy on ICT for education by demonstrating disparities between girls and boys, women and men, and importantly by developing programs dedicated to encouraging and including girls and women.

### **Political**

#### **Weak policy design-implementation linkages**

The need to develop the infrastructural backbone (internet connectivity, optic fibres for connectivity, reception signals, installation of computers, power supply) are conceived as critical to effective establishment of a sustainable information society. According to World Summit on the Information Society (WSIS)(2003), "Infrastructure is central in

achieving the goal of digital inclusion, enabling universal, sustainable, ubiquitous and affordable access to ICTs by all ...” and exhorts world governments “...to support an enabling and competitive environment for the necessary investment in ICT infrastructure and for the development of new services. The greatest hurdle however, is the translation of ICT policy and development plans into coherent and internally consistent ICT programmes that can be effectively implemented at institutional levels (schools, colleges and universities). Lack of sufficient grass root consultation and effective co-ordination of policy at regional and institutional levels while accounting for the different situated contexts that ICT implementation unfolds frustrate well conceived ICT policies in Africa.

Tamukong (2007) suggests that Cameroon government formed a National Committee of Experts who came out with its ICT policy based on a comparative study approach complemented by a local case study without wide stakeholder participation. In Burkina Faso and Guinea the policy was drawn up by the government with assistance from the Economic Commission for Africa (ECA) and the Canadian International Development Research Center (IDRC) (Ibid). These are living examples of how national governments may override civil society participation in the drafting of policy interventions that may have fundamental impacts on the wider society. Because the schools administrative structures are called upon to implement policy imperatives that they were not involved in their conception and design, these critical educational stakeholders are disposed to be sceptical about the sincerity of ICT policy and to drag their feet in implementing policies and programmes they do not own.

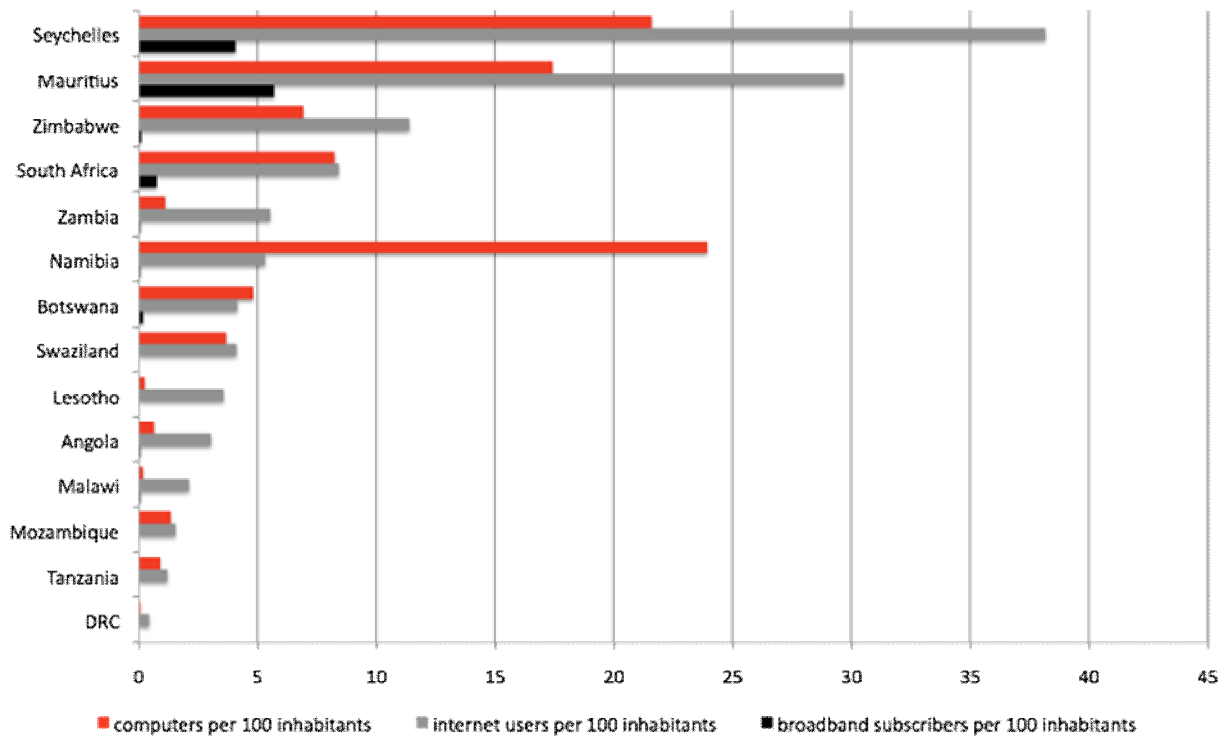
### **Psychological barriers**

One of the psychological barriers to effective teaching with computers is that computers are often seen to subvert teacher control and influence in teaching or as replacements for teaching by some teachers. Haber and Mills (2008) suggest that some observers contend that e-learning will reshape education and make the stand-up lecture obsolete by enhancing the opportunities for class participation and permitting more individualisation of content. The surge in web based technologies like digital libraries, social networking sites (blogs, wikis, RSS feeds), and open access educational resources (like courseware,

learning management systems) are shifting and challenging teachers' epistemological views and conceptions of how expert academic knowledge is generated and bringing anxieties and fears about how much of these technologies could be integrated into the classrooms and with what results. Such fears become psychological barriers as teachers may obstruct students' use of the technologies for learning and teaching.

## Mozambican ICT landscape-A case study

### SADC Computer and Internet access and usage



(Source: ITU 2009 Telecommunications Development Report)

As demonstrated above, Mozambique is not a broadband subscriber, is the SADC country with the third least developed internet users in the region. The number of Mozambicans with access to computers is also not impressive, suggesting that the bulk of the citizenry still are cut out of the cyber space. This is due to several compounding factors that include poverty, illiteracy and phobia for technologies, among others.

## Barriers to online learning in Mozambican schools

### Unreliable and patchy physical access to the internet

Physical access to the internet and computers in Mozambican schools is constrained by several factors inter alia the following: The geographic distribution of the population, many of whom live in remote, rural areas, limited availability of computer technology, varying degrees of electricity coverage, and low levels of technological skill (International Training and Education Center on HIV (I-TECH) (2009)). The geographical dispersion of rural communications implies that electrical power generation and distribution is difficult to effect to power up the computers and allow internet access in rural schools. The implications of this are that ICT literacy practicals and the development of digital literacy among students are disrupted as conduct of such lessons depend on availability of electricity.

The table below summarises the development of internet access in Mozambique and its international ranking.

<b>Year</b>	<b>Internet users</b>	<b>Rank</b>	<b>Percent Change</b>
2003	22,500	134	
2004	50,000	137	122.22 %
2005	50,000	138	0.00 %
2006	138,000	129	176.00 %
2007	138,000	130	0.00 %
2008	200,000	126	44.93 %
2009	200,000	126	0.00 %
2010	350,000	119	75.00 %

(Source: Index Mundi website, 2009)

Mozambique has an estimated 350 000 users, the majority of which are concentrated in Maputo, the capital city and only fragments thinly spread across the rest of the country. Since 1993 when internet was introduced in Mozambique “only 1.6% of its total

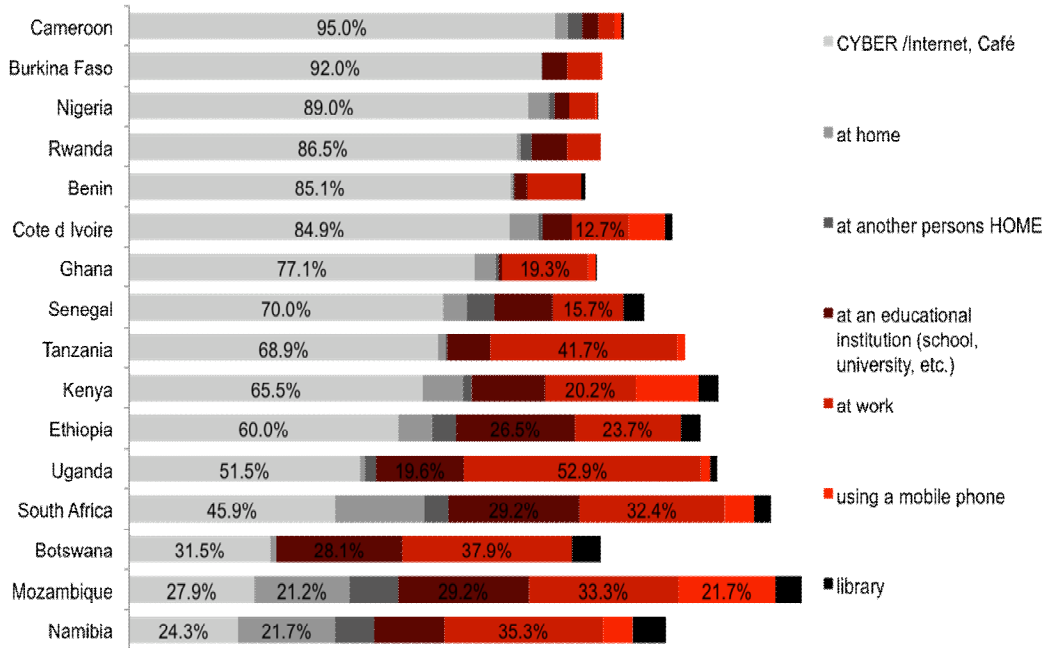
population has access to internet” (World Stats, 2009). Worse still, “of the 1.6% who have access to internet, 75 % of them live in the capital city, Maputo where the population is only 1,109,798 (’08)” (Ibid). Rural schools that constitute the majority of educational institutions in the country still suffer from virtually no access to electricity and for the few fortunate rural schools where computers have been donated, these constraints need to be overcome.

### **Skewed distribution of telephone infrastructure**

It is noteworthy that the type of connectivity a user is able to get also determines the speed and quality of data transmissions and access in general. For example, even with a fast modem, the reliability and speed of transmission may be affected by the physical quality of telephone lines in the region (Dholakia, 1997). Because dial up access remains one of the most reliable form of internet access withstanding its high costs, telephone density becomes a critical factor in internet access. However, statistics on the number of telephones in this country is not impressive. House hold data for 2007/2008 suggest that Mozambique had 22 365 residential lines and 76 407 fixed line subscribers (2006 supply side data) in a national population of 21,669,278 people (World Internet Statistics, 2010) and this telephony coverage was highly skewed in favor of Maputo and other few urban areas. This skewed geographical distribution of power constrains universal access to computers among rural schools. The few rural areas that have access, often suffer from erratic electrical supply and power outages which disrupt student extended access to computers and downloading of long documents.

## Institutional access constrain mobile learning of ICT applications

### Points of internet access



(Source: Gillwald, 2009, p. 15)

From the diagram above, internet access in Mozambique is restricted to academic institutions, cybercafés, and mostly at work with a limited amount of access through mobile phones. The above statistics demonstrate that a very limited amount of internet and computer access happens through using mobile phones thus limiting mobile learning. Even in Universities which were the forefront of early internet developments in Africa, very few universities have full internet connectivity (Jensen, 2000). This is partially attributed to limited resources and high costs of installing, upgrading and servicing computer facilities and providing broad bandwidth. While lifelong learning is a crucial requirement of this competitive information age as technological developments diminish the usefulness of already acquired skills, the digital divide in Mozambique frustrates rural and some urban schools' literacy development efforts. It has been argued that construction and reconstitution of the internet infrastructure requires major investment, which will have various gestation periods, and so requires careful attention to timing.

## **Poverty**

Mozambique is one of the poorest nations in the world (afrol.com, 2008) and more than 80% of its citizens in rural areas live on less than a US\$1 a day, and lack basic services like schools and hospitals (Rural Poverty Report-Mozambique, 2007). This limits the purchasing power of the rural dwellers and some impoverished urbanites, yet most Internet cafes in Maputo and across the country charge US\$2- 3 an hour for access and dial-ups cost US\$30. The digital divide (rural-urban divide) is affirmed by the fact that “75% of internet users are located in Maputo and surrounding communities and the remaining 25% at the provincial level” (Ibid) when “71% of Mozambique’s total population lives in the rural areas” (Censo, 2007)

Hanlon confirms that “besides assistance from international organizations and the 4.5% economic growth of Mozambique, the number of poor people in the country is ever increasing” (Verdade, 04/12/2009). Poverty constrains the development of digital literacies as many pupils in rural schools cannot afford to buy laptops, or computers and the few privileged ones have to rely on few geographically dispersed cybercafés to access internet and computer services. Many schools in the rural areas are poverty stricken, cut off from the internet and cannot afford to buy computers because of financial constraints. In cases where electricity is available, it can not reliably meet the growing needs for power in the face of the new curriculum that emphasizes hot seating (particular night lessons or study).

## **Conditions of access and Epistemological access**

Some barriers to e-learning often mentioned are: the need for more maturity and discipline among the students, greater time and effort required for teaching, lack of acceptance among the faculty, and greater costs (Allen & Seaman, 2006). In relation to Computer- and Internet-based distance learning modalities, International Training and Education Center on HIV (I-TECH) suggests that educational institutions in Mozambique face more serious constraints, related primarily to students’ poor computer access and limited computer skills, in addition to Mozambique’s varying degrees of electricity



coverage. I-TECH (2009) elaborates that the high cost and slow speed of Internet access also inhibit the delivery of Internet-based courses. These constraints limit the number of hours students access computers and their capacity to meaningfully engage with the specific computer programmes, enhancement of their information processing abilities and fostering of media literacy. The limited technological fluency of students also limit educational use of computers as students often lack discipline to academically apply this technology due to limited exposure-an undercutting of their epistemological access to ICTs.

On the other hand, the level of literacy of the total population (male and female) is estimated at 47.8% (Giroth, July 2008), estimated 60% of adults still cannot read and write, with the illiteracy rate higher among women (USAID, 2009) and illiteracy rate currently pegged at 43% (Ali, September 2009). The effective application of computers and other related educational technologies for the development of different forms of literacies (digital literacy, media literacy, information literacy) is incapacitated when pupils have underdeveloped literacy practices. Information extracted from the internet is likely to be uncritically accepted without authenticating it, information synthesis through reflexive engagement with knowledge posted on websites is less possible when students have less sophisticated literacy levels.

### **Shifting perspectives on literacy**

In addition, a capacity for lifelong learning is a crucial requirement of this competitive information age as technological developments diminish the usefulness of already acquired skills. Increasingly, learning to read and write is becoming inadequate as the notion of literacies is increasingly being broadened to cover academic literacies, media literacy computer fluency, and the effectively handling, managing and application of information (information literacy). Yet the Literacy Curricula Plan of Mozambique retains a minimalist definition of literacy:

Literacy is regarded, on the one hand, as the acquisition of the basic notions of reading, writing and numeracy and, on the other hand, as a process that

stimulates participation in social, political and economic activities and lays the foundation for continuing education. The concept also reflects a form of functional literacy that is an integral part of local development (MINED 2003a, p.57).

While the first version of literacy retains the functional forms of literacy related to acquisition of decontextualized skills, the latter definition seems linked to distance learning and /lifelong learning. The missing link in this conservative definition of literacy is conception of literacy as composite of practices that activate and closely integrate epistemological framing, the social construction of power, the development of positioning and agency in a socio-cultural context. Emerging body of literature is shifting from the conception of literacy to literacies imbedded in situated contexts, involving the use of multimodal and semiotic resources (Lea and Street 1998; Lea 1996; Gee 1990; Lankshear & Knobel, 2008). The difficulties in moving from literacy to multiliteracies in Mozambique has been partly caused by the constraints in conceptualization by academics-in particular, how emerging web based and educational technologies can be used to activate and foster higher forms of information rich, technology enhanced practices.

Academics are often frustrated by the fast pace of technologies that limit their capacity to learn and teach with technology or are less exposed to new forms of technologies that could have pervaded other countries' educational institutions. These epistemological glitches constrain the extension of the frontiers of knowledge through the broadening of epistemological access among students.

### **Essence of using technology to transform pedagogical practices**

One critical aspect of technology mediated teaching is not that technology dictate the pace and direct pedagogical practices as technology pundits suggest, rather is how technologies can be appropriated and used as meditational tools to support and enhance teaching. This instrumentalist view can be further refined by arguing that computers and other learning technologies (audio visuals, data projectors, web based technologies

(wikis, online encyclopedias, RSS feeds, podcasts) are only one among an array of instructional tools (curriculum, course content, black board, classrooms aids) that should be constructively aligned to bring about an information rich, meaningful learning environment. As Njenga and Fourie (2010) aptly suggest in relation to recent studies on ICTs application in learning:

Indeed there has been no clear distinction between teaching with and teaching about technology and therefore the relevance of such studies has not been brought to the fore. Much of the focus is on the actual educational technology as it advances, rather than its educational functions or the effects it has on the functions of teaching and learning (p. 200).

Identifying with these authors we argue that ICTs in as such as they are enablers of learning which they are carefully aligned with an effective pedagogical strategy, research should examine its disruptive effects to close the teaching and learning gaps that come with its inappropriate/ineffective use. Technology can disrupt the teachers' teaching strategy if they have not engaged with how the learning environment, content and the structure of the lesson would be configured when it is introduced into the classroom. More importantly, the introduction of technology for teaching also adds additional roles for the teacher in terms of sources the information, preparing the powerpoint presentation and integrating the technology into the curriculum. While technology is believed to contribute to learning gains, institutions also need to step back, take stock of what additional gains technology had brought to the educational environment.

### **Appropriation of technology to enhance online learning**

Kope (2006) listed a number of learning skills and strategies that she terms "academic literacy" namely, critical thinking, advanced reading skills to learning with and from technology. Beard and Dale (2009) complement by suggesting that critical thinking is an essential skill in the print environment but is arguably more vital in the digital learning environment as the plethora of electronic resources available demands a level of discernment and evaluation on the part of students that earlier generations learning from books and a small selection of printed journals did not have to consider. We transcend

these authors' views by arguing that technology should be harnessed to leverage learning by creating liberated zones for reflexivity at personal and collaborative interaction levels. It should not only recruit and focus student attention in the accomplishment of learning tasks but should elicit in the learner the requisite conceptual constructs useful for future problem solving in different learning contexts. The limited ICT skills of teachers necessitate the institution of effective ICT training strategies to upgrade and enhance their competences in the use of ICT to deliver the curriculum.

### **Bridging cleavages between institutional and home based literacies**

Given the porosity of the boundaries between academic literacies and community based literacies, and the implicit notion that students bring to the institution some tacit knowledge, it is important to use web based technologies as spaces where the integration of these knowledge unfolds. The increasing hybridity of discourses in the classrooms by students from heterogeneous communities necessitate technology use for the integration of what Bakhtin (1981) calls authoritative discourses and internally persuasive discourses. In classrooms, hybrid discourse practice involves teachers and children juxtaposing forms of talk, social interaction, and material practices from many different social and cultural worlds to constitute interactional spaces that are intertextually complex, interactionally dynamic, locally situated accomplishments (Kamberelis 2001).

Technology like reflexive blogs and digital libraries are useful resources that can be used by both the teacher and the students for critical engagement, self reflection, and collective knowledge building. Students can use reflexive blogs to develop academic literacy skills that bridge community based knowledge and formal institutional knowledge (pedagogical knowledge) to support critical and reflexive writing, information sifting and synthesis, and collaborative engagement in ways that formal authoritative teaching practices do not afford and cannot sustain. Technology can be harnessed to unlock the internalist nature/focus of mainstream academic teaching and open it to other rival forms of knowledge (like tacit knowledge) to bridge the rift between these two knowledge production universes.

## **Conclusion**

The paper has examined the inhibitors to technology mediated teaching and learning and the potential of ICTs to enhance the development of best practice of pedagogy to support information rich, technology mediated learning. We argued that the Mozambican ICT landscape although developing at a creeping pace, is still too fragmented to support ICT literacy and information literacy development at the grassroots (schools). The ICT policy framework has not been effectively implemented in rural schools levels because of a host of inhibiting factors ranging from limited ICT support and experience of rural and urban academic staff, weak ICT implementation and monitoring framework, limited infrastructural developments (erratic electricity supply, lack of / limited number of computers in rural schools and peri-urban areas, unreliable internet networks).

Epistemological access has been hindered by low literacy rates, a minimalist definition and application of the terms literacy, and failure of teachers to use computers to enhance and enable the development of critical literacy. We have argued for a conception of literacy that transcends the acquisition of decontextualised skills to embrace literacy as a practice that is deeply implicated in the exercise of social power, self and relational positioning and the application of agency. The cultural and discursive hybridity of classrooms necessitate a new construction of the role of technology not just as an enabler of learning, but as one among a range of tools and processes that need strategic alignment to ensure student meaningful learning. We have argued that while appreciating the potential of technology to shift teaching and learning practices, teachers and educators should take a step back to evaluate the conditions under which technology mediated teaching becomes effective, the possible unanticipated disruptions technology can cause and the overall educational gains its use affords.

Lastly, we have proposed that technology is a useful vehicle through which the cleavages between institutional ‘pedagogical content knowledge’ (Schulman, 1987) and community based knowledge could be bridged through the integration of the latter (often packaged in form of tacit knowledge) into the former. To that effect, we have argued that the hybrid

discursive nature of new web based technologies like reflexive blogs, wikis, digital libraries and social networking sites could be harnessed to ensure that this integration happens, as classrooms are already assuming hybridity. As such, there is no point in leaving knowledge production as exclusively dominated by authoritative discourses, when the classroom-out of classroom and institutional-community divides are increasingly blurred.

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<sup>i</sup> We concur with the definition of ICTs as: “technologies that facilitate communication and the processing and transmission of information by electronic means. This definition encompasses the full range of ICTs from radio and televisions to telephone (fixed and mobile), computers and the Internet. (Department for International Development (DFID), 2002, p. 6).