

# Mobile Technologies for Enhancing Distance Learning in Tanzania: An Exploratory Study

*Ezra K. Maritim and Honoratha M. K. Mushi*

Open University of Tanzania, Tanzania

Email:cos.sadcout@out.ac.tz

**Abstract:** *This exploratory study on m-learning was designed for two purposes. The first purpose was to identify the extent to which the Open University of Tanzania uses mobile phone to communicate with the distance learners on administrative and academic matters. The second purpose was to identify the distance learners' capacity to afford mobile phones, their level of mobile phone usage and the learners' envisaged opportunities and challenges in mobile phones use for enhancing learning. Both quantitative and qualitative approaches were used in data collection and analysis. Results showed that (a) The Open University of Tanzania rarely uses mobile phone to contact students; (b) while mobile phones are affordable and hence are accessible to majority of learners the type and capacity of the mobile phones owned cannot accommodate extensive pedagogical use; (c) running costs for large scale use of mobile technology may prove unsustainable for the majority of learners whose disposable income is low and this constitute a hurdle for large scale pedagogical use; and (d) the student-student and student-tutor mobile communication for academic and administrative issues is relatively low. The efficacy of mobile technologies for pedagogical purposes is discussed in relation to the need for blending teaching and learning strategies in ODL and further research.*

**Keywords:** Open and distance learning, mobile phone, e-learning, m-learning.

## INTRODUCTION

For various reasons, open and distance learning is globally gaining prominence and legitimacy from many quarters. These quarters include *inter alia*:

- Those that intend to use open and distance learning to create education and training opportunities for non-conventional learners and trainees (Southern African Development Community, 1997; World Bank, 2003; Perraton, 2007).
- Those looking for cheaper options of offering mass education at all levels in order to redress and close gender and socio-economic gaps (World Bank, 2003; Perraton, 2007).
- Those who consider open and distance learning as a window of opportunity to make profit and raise surplus income (Perraton, 2007). Those in this category include dual mode institutions that raise substantial money from distance learners and provide poor services for purpose of filling a financial gap arising out of conducting conventional learning (Maritim, 2009).
- Those who promote human rights. The new constitutions of many developing countries including those of Kenya and South African enshrine education as a human right.
- Those who look upon open and distance learning as a vehicle for the achievement of the Millennium Development Goal of “Education for All by 2015”, and

- Those who promote delivery of distance learning, soft skills training and lifelong learning for those engaged in full time employment through technology-based methods (World Bank, 2003). This category include ODL practitioners and institutions; business professionals and technology producers and dealers.

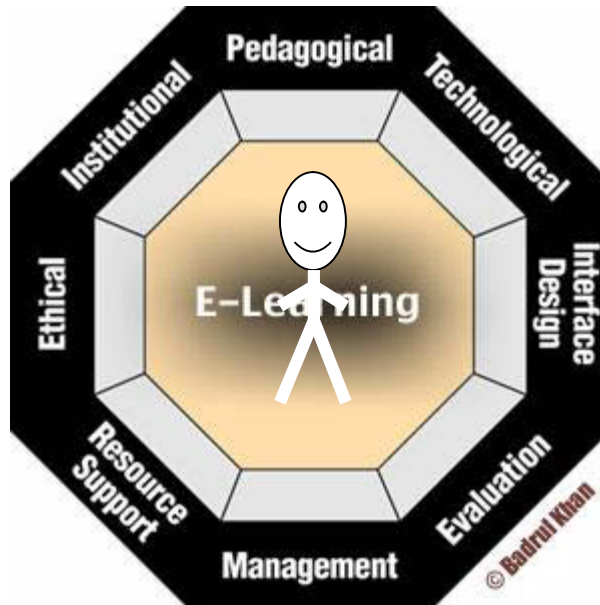
It is the last category of distance learning promoters that this paper examines. While there are varieties of technology-based methods for the delivery of distance learning, not all of them are effective in reaching remote and disadvantaged learners. Of all the e-learning technologies that are in the market, this paper examines the extent to which mobile technologies can be used to augment and sustain distance learning.

The use of mobile technologies for large and small scale business transactions and learning contexts is an emerging development in Africa. Indeed, m-learning is a major driver of ‘a’-learning (anytime, anyplace, anywhere learning) and thus “*allowing learners to participate in educational activities without the restriction of time and place*” (Brown, 2003:1). This situation also applies to those involved in large and small scale businesses and soft skill training.

The advantages of mobile technologies and m-learning that have been identified in the literature include *inter alia*: little requirement of minimal operational technical skills (basically learning ‘on the job’); free of viruses which is a major problem to online learning and communication; free of fear and phobia normally associated with online learning (computer use); portability, mobility, flexibility and convenience; enhancement of quality education; capability of both synchronous and asynchronous audio communications; and wide penetration into areas with limited infrastructure (BBC World, 2003; Brown, 2003).

### **E-Learning Conceptual Framework**

Khan’s (2001) E-Learning Framework given in Figure 1 identifies eight dimensions that are essential for *creating an effective and meaningful e-learning environment* for learners and users. These dimensions represented in the adopted figure given below are: pedagogical, technological, interface design, evaluation, management, resource support, ethical and institutional.



**Figure 2: Adopted Khan's (2001) E-Learning Framework**

As summarised in the Table 1 given below, each dimension has several sub-dimensions-the specific issues each e-learning dimension focuses on.

**Table 1: E-Learning Dimensions and Sub-Dimensions**

E-learning Dimension		Sub-Dimensions (The issues the E-learning Dimension addresses)
1.	Pedagogical Dimension (teaching and learning) of E-learning.	<ul style="list-style-type: none"> <li>• Content analysis</li> <li>• Audience analysis</li> <li>• Goal analysis</li> <li>• Media analysis</li> <li>• Design approach</li> <li>• Organisation</li> <li>• Methods and strategies.</li> </ul>
2.	Technological Dimension of E-learning (technological infrastructure).	<ul style="list-style-type: none"> <li>• Infrastructure planning</li> <li>• Hardware</li> <li>• Software</li> </ul>
3.	Interface Design Dimension of E-learning (overall look and feel of e-learning programs).	<ul style="list-style-type: none"> <li>• Page and site design</li> <li>• Content design</li> <li>• Navigation</li> <li>• Usability testing</li> </ul>
4.	Evaluation for E-learning.	<ul style="list-style-type: none"> <li>• Assessment of learners</li> <li>• Evaluation of the instruction</li> <li>• Evaluation of the learning environment</li> </ul>
5.	Management of E-learning.	<ul style="list-style-type: none"> <li>• Maintenance of the learning environment</li> <li>• Distribution of information</li> </ul>
6.	Resource Support Dimension of E-learning.	<ul style="list-style-type: none"> <li>• Online support and resources required to foster meaningful learning environments</li> </ul>
7.	Ethical considerations Dimension	<ul style="list-style-type: none"> <li>• Social and political influence</li> </ul>

	of E-learning.	<ul style="list-style-type: none"> <li>• Cultural diversity</li> <li>• Bias</li> <li>• Geographical diversity</li> <li>• Learner diversity</li> <li>• Information accessibility</li> <li>• Etiquette</li> <li>• Legal issues.</li> </ul>
8.	Institutional Dimension of e-learning.	<ul style="list-style-type: none"> <li>• Administrative affairs</li> <li>• Academic affairs</li> <li>• Student services.</li> </ul>

**Source: Khan, 2001**

The question that Khan's e-Learning Framework seeks to answer is: "what does it take to provide the best and most meaningful flexible learning environments for learners worldwide?" (Khan, 2001:2). Though Khan's e-learning framework tends to be seen more from an online learning environment perspective, as a subset of e-learning, m-learning environment fits into this e-learning framework too.

### **Mobile Technologies Usage in Educational Contexts**

Advances in technology including ICT are influencing the socio-economic development of nations and more importantly the delivery of services across the globe and in-country. Africa's development indicators reflect *inter alia*:

- The African continent was one of the poorest continents at the turn of the 21<sup>st</sup> century (World Bank, 2000).
- A continent with a huge "digital divide" along such fault lines as gender, age, socio-economic status, and distance from urban areas, (Adam, 2003) and
- A continent that enjoys only about 2% of the world internet connectivity (Adam, 2003).

Given these prevailing conditions, delivering of teaching and learning through ODL mode presents a challenge. ODL institutions and instructors have to grapple with a number of decisions and choices to make. The critical decisions to be made include *inter alia*:

- What type of ICT to use to deliver education and training *vis-a-vis* the level of the e-readiness of a country?
- At what cost to the provider and the learner?
- What ICT combinations are feasible and practical?

The mobile technologies such as wireless palmtop (handheld) computers and mobile phones are the emerging technological innovations that are influencing our activities in both educational and non-educational contexts. These mobile technologies are able to offer easier and quicker access to information and communication on what has come to be known in e-learning as "a-learning" (anytime, anyplace, anywhere learning) (Khan, 2001). In view of their cost and user friendliness, mobile phones are more commonly used than palmtops in remote areas.

The primary mode of delivery of distance learning that has been described as more reliable, sustainable and widely used than online learning in developing countries is print (Leary & Berge, 2006; Islam, Rahman & Rahman, 2006). This is dictated among other factors by poor infrastructure, highly limited technical support, high costs and low and unreliable Internet connectivity (Adam, 2003; Citizen, 2011). In most cases, the criticism labeled against distance learning mode of delivery is based on the impersonal methods embedded in print as compared with fact-to-face learning. This has led to the perceptions in both developed and

developing countries of distance learning as a second-rate learning (Perraton, 2007). Given this negative perception, Baggaley (2008:41), pose the question: “*So why do DE institutions not universally seek to eradicate this image by adopting the cost-effective interactive educational technologies available to them?*” The adoption of the new breed of mobile technologies in ODL has been weighed against this challenge. Indeed, on the recognition of the diversified environments where distance learners are found, ODL practitioners have embraced the diversification of delivery methods. This approach has come to be known in ODL literature as hybridisation of distance learning methods or simply blended learning (Moore & Kearsley, 2005). The hybrid ODL delivery methods provide several combinations that include *inter alia*:

- Combination of online with face-to-face sessions.
- Combination of print-based materials with CDs.
- Combination of online with print-based materials
- Combination of print-based materials with face-to-face sessions.
- Combination of teleconferencing with print-based materials.
- Combination of m-learning with print-based distance learning and other ICTs.

Several other delivery combinations can be derived. This blending approach is intended to:

- Enhance teacher-student and student-student interactions.
- Bridge equity gap based on social-economic status,
- Enhance the quality of instructions, and
- Enhance the chances of attaining educational outcomes.

In a situation, as it prevails in Africa, where the majority of learners in rural areas have little or no access to Internet, Brown (2003:10) summarised envisaged future place of m-learning in education in Africa as follows:

- “*M-learning is supportive mode of education and not a primary mode of education.*”
- *The most appropriate mobile device for learners in Africa is a mobile phone.*
- *Possibilities and latest developments in mobile technologies must be tested against practicality, usability, cost-effectiveness, and ...envisaged learning outcomes.*
- *The major focus of M-learning should be more on communication and interaction than on contents”.*

In some cases the use of mobile phone has made significant contributions and impact on learner participation and institutional cost. In 2002/2003, the University of Pretoria, South Africa, started experimenting on sending bulk SMS to teacher trainees on administrative, contact sessions, notification of study materials distribution, assignments, and examination matters (Brown, 2003; Hendrikz, 2008). The following four lessons from this M-learning experiment are worth noting:

- Teacher–student contacts through mobile phone enhanced the learners’ feeling of the sense of belongingness to the University (Hendrikz, 2008). When a learner receives a call or SMS from the tutor to remind him or her for example about delayed assignments he/she feels he/she belongs to the University. This is a motivation to a learner who has suffered from studying in isolation.
- Examination registration rose from 40% to 58%; 95% of the students attended contact sessions; and student responded in mass and almost immediately on information provided in SMS-messages (Brown, 2003).
- The cost of sending bulk SMSs was calculated to be 20 times less than using print and the postal services to distribute information to students (Brown, 2003).

- While SMS provided immediate information, posted information would have taken between 3 and 18 days to reach all the students in remote locations (Brown, 2003).

Similar utilisation of mobile phones in distance learning has been carried out in Philippine by the University of Philippines Open University (Bandalaria, 2007; Librero, Ramos, Ranga, Trinona & Lambert, 2007). In this country with over 7,000 islands, mobile phone communications have limited barriers. Though e-learning is globally being used by both conventional and ODL institutions as a way of supplementing other forms of instructional delivery in schools and colleges, the relative contributions, benefits and limitations for education providers and learners of m-learning, as a sub-set of e-learning, are yet to be fully explored in Tanzania. The current study was designed with two purposes in mind. The first purpose was to identify the extent to which the Open University of Tanzania uses mobile phone to communicate with the learners. The second purpose was to identify the distance learners' capability to afford of high capacity mobile devices and their envisaged opportunities and challenges of the mobile phones use for learning.

### Study Context

This study is being undertaken in a context where electricity and telecommunication infrastructure have just reached a smaller proportion of the population. These two utilities drive the level of ICT penetration in the country. Despite these challenges, the cost of ICT-related equipment in Tanzania may have been influenced by the Government waiver of *“taxes on computers and reduced license fees payable by telecommunication companies”* (Wright, Dhanarajan & Reju, 2009: 6). The bad news for mobile users is that the Government does not extend the tax waiver to mobile phones. The mobile phone market houses six highly competitive operators, namely: Tanzania Telecommunication Company Limited (TTCL), vodacom, airtel, zantel, tigo, and sasatel.

The fastest growing ICT industry and mass market in Africa is mobile phone. Mobile phone market penetration is now about 54% and this represents more than 90% of all telephone lines in the continent (Schwartz, 2010). This continental trend is also being experienced in Tanzania. While radio is widely spread in Tanzania, the mobile phone and internet penetration, expressed as a percent of the population that use them, as shown in Table 2 now stands at about 62% and 3% of the population, respectively.

**Table 2: ICT Profile and Electricity Penetration in Tanzania**

Technology Profile and Electricity	Percent Penetration		
	Urban	Rural	Population
Radio	85%	84%	85%
Television	59%	14%	27%
Mobile Phone	82%	54%	62%
Internet	8%	1%	3%*
Electricity (grid)	12%	2%	14%

**Source: Data was obtained from a variety of sources: (AudienceScapes National Media Survey Tanzania 2010 and others)**

\*Most reports give an overall of 1.3% Internet penetration in Tanzania. AudienceSpaces (2010) study of a sample of 2003 subjects gives a much higher figure of 3% internet penetration.

The current technology profile in Tanzania clearly demonstrates that the high penetration of traditional technology-the radio- and the emerging technology- the mobile phone-is related to

the ability of the low income and disadvantaged groups to purchase and maintain these technologies and the low reliance of these technologies on grid power. Other non-grid power sources such as dry cell batteries, solar and generators are enough to power these devices. In most cases, the 2% rural electricity penetration is concentrated in district administrative headquarters. This technological profile should also be considered in relation to the e-readiness index for Tanzania. As defined by Economist Intelligence Unit (2006:1) e-readiness:

*“is the ‘state of play’ of a country’s information and communications technology (ICT) infrastructure and the ability of its consumers, businesses and governments to use ICT to their benefit...It is not simply a matter of the number of computers, broadband connections and mobile phones in the country”.*

The e-readiness index for Tanzania has not been measured. The only countries in Africa whose e-readiness ranking has been measured are South Africa, Egypt, Nigeria and Algeria (Economist Intelligence Unit, 2006).

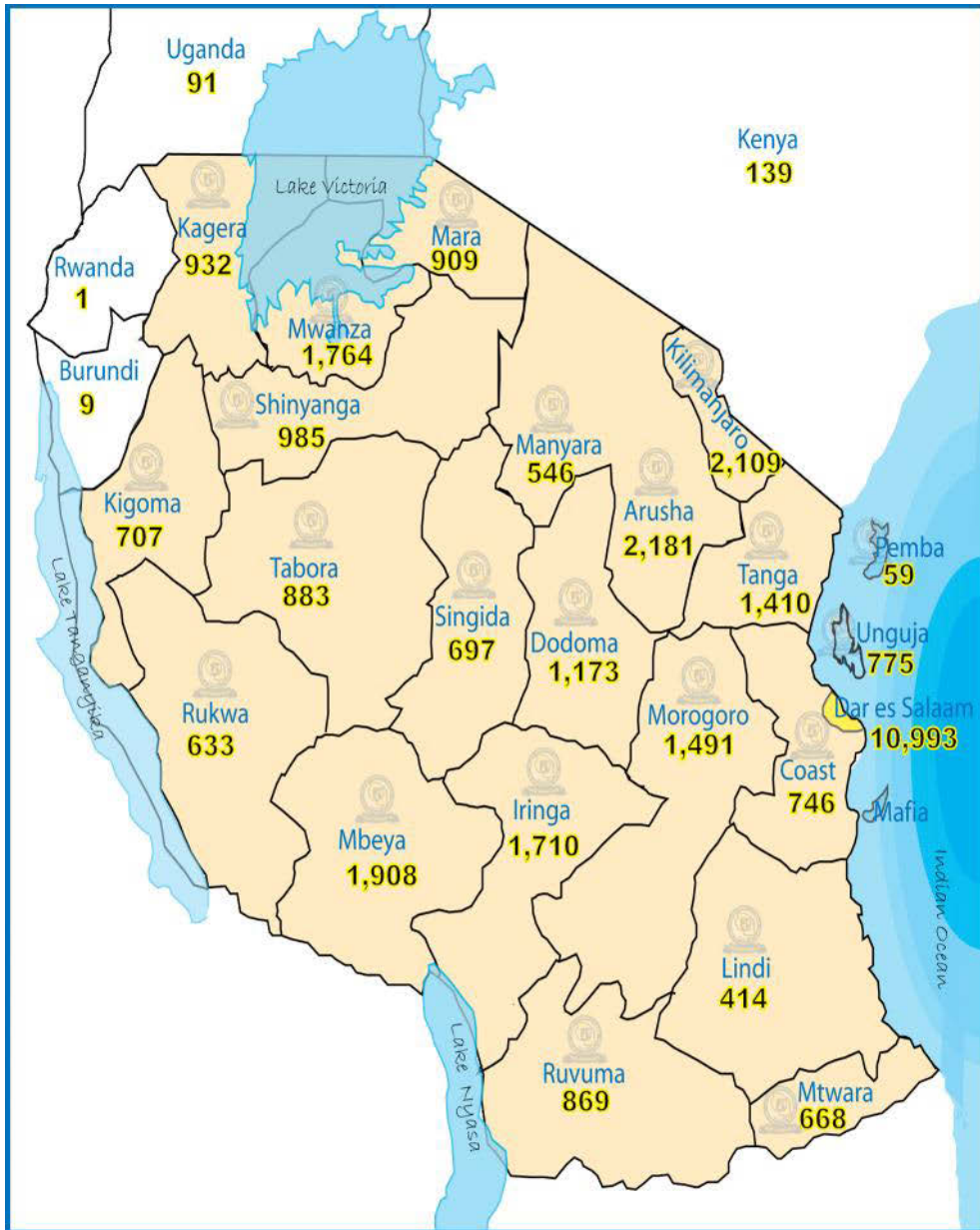
### **Method**

This exploratory field study on the use of mobile technologies for educational purposes by distance learners registered with The Open University of Tanzania was conducted in June 2011.

### *Sample*

The study sample of 77 respondents (31 females, 46 males) was conveniently drawn from two urban Regional Centres of The Open University of Tanzania: Dar es Salaam and Iringa. Iringa Regional Centre is about 500 kilometers from Dar es Salaam. The Open University of Tanzania has 24 Regional Centres countrywide that provide distance learners with such services as library, internet access, study space and distribution of study materials and academic counseling. The map given below shows the distribution of these learning centres, the number of students enrolled from each region and the two regions, Dar es Salaam and Iringa, where the study sample was drawn.

The Open University of Tanzania Regional Centres and Student Numbers



The mean age of the female students was 34.5 years, with a range from 22 to 57 years, while the mean age of the male students was 33.9 years, with a range from 21 to 50 years. The over-all mean age for both genders was 34.2 years.

*Instrument*

For the purpose of this study, a 14-item questionnaire was developed to capture the learners’ socio-demographic data, types of mobile phones owned, cost of the mobile phone, degree of mobile phone use by the learners and the institution, opportunities and the challenges that the learners face with mobile phone use. The list of mobile devices was adopted from Keegan



(2003). A category of what is referred to in this study as “ordinary mobile phones”, meaning the simple handset mobile phone that is used by the majority of people in Tanzania, was added to Keegan’s list. The questionnaires were distributed to students who visited the two Regional Centres to study or consult with their course facilitators in the first two weeks of June 2011.

## Results and Discussion

The results and the discussion are structured along the following four broad areas captured by the data collection instrument used: socio-demographic variability; cost and capacity factors; level of usage; and opportunities and challenges.

### *Socio-Demographic Variability*

Besides age variability among the distance learners sampled, employment pattern given in Table 3 shows that 42% were employed as teachers.

**Table 3: Employment Status**

Employment Status	Frequency	
	n	%
Teacher	32	42%
Others	28	36%
Missing	17	22%
<b>Total</b>	<b>77</b>	<b>100%</b>

The category of others include engineers, laboratory technicians, business men and women, secretaries, agricultural officers, human resource managers and full-time students. For all the employment categories 84% of the learners were engaged as full-time employees.

Traditionally, ODL in Tanzania had been dominated by those in full time employment and in particular the school teachers. This situation is now changing. The recent Government policy introduced in 2010/2011 academic year to admit high school graduates in the same way other students are admitted to conventional universities has changed the ODL landscape with respect to:

- The socio-demographic profile of the learners, and
- The perception of ODL as a “second chance” to “first choice” access route to higher education and training.

### *Cost and Capacity Factors*

Seventy six (99%) learners sampled owned mobile phones. While mobile phones are relatively cheaper than other information and communication devices, one has to analyse the mobile phone’s degree of usability, capability and limitations to perform the intended tasks of teaching and learning. In order to capture these functionalities, four sets of information were collected: types of mobile phones available in Dar es Salaam; their average prices; average memory capacity; and the learners’ level of affordability of the types surveyed. Affordability was measured by the cost of the mobile phones the learners currently own. There are two cost components: the cost of the purchase of a mobile device and the cost of operating it.

Table 4 summarises the results of the survey and the market prices of the mobile devices in Dar es Salaam. It is clear from this survey that the high capacity mobile technologies are beyond the reach of most ODL learners in Tanzania.

**Table 4: Range of Mobile Technologies, Capacities and Cost**

Mobile Technology Type	Technical Specifications	Information Storage Capacity	Cost	% Learners Owning
Palmtop computer	Apple Iphone 4,GSM, HD screen, video calls two way camera, multitasking, 5MP camera & led flash, HD video recording & editing.	<ul style="list-style-type: none"> <li>• 16 GB</li> <li>• Term paper</li> <li>• Attachments</li> <li>• Thesis</li> </ul>	Tshs.1,942,210 (US\$1,253)	13%
Screenphone	Blackberry curve 9300, Wifi, email and IM, gps & maps, camera & video, media player, Bluetooth & voice.	<ul style="list-style-type: none"> <li>• 3 GB</li> <li>• Term paper</li> <li>• Attachments</li> <li>• Thesis</li> </ul>	Tshs.731, 460 (US\$ 472)	
PDA*	Blackberry curve 9800, Wifi, email & IM, gps and maps, camera & video, media player, Bluetooth & voice.	<ul style="list-style-type: none"> <li>• 3 GB</li> <li>• Term paper</li> <li>• Attachments</li> <li>• Thesis</li> </ul>	Tshs.1,492,980 (US\$ 963)	
Smartphone	Blackberry curve 9700, Wifi, email and IM, gps & maps, camera & video, media player, Bluetooth & voice.	<ul style="list-style-type: none"> <li>• 3 GB</li> <li>• Term paper</li> <li>• Attachments</li> <li>• Thesis</li> </ul>	Tshs.981,960 (US\$ 634)	
Mobile phone with WAP	Nokia X2 with 1GB memory card capacity.	<ul style="list-style-type: none"> <li>• 1 GB</li> <li>• Term paper</li> <li>• Attachments</li> </ul>	Tshs.313,960 (US\$ 203)	
GSM, GRPS & EDGE	Gps, Wifi, Bluetooth, email and IM, 2 PM camera, media player, HI DEF	<ul style="list-style-type: none"> <li>• 1GB memory. expandable</li> <li>• Term paper</li> <li>• Attachments</li> </ul>	Tshs.647,960 (US\$ 418)	
Ordinary /Common Mobile Phone	Varied.	<ul style="list-style-type: none"> <li>• 32 and plus KB</li> <li>• Up to 160 words Abstract</li> </ul>	Tshs.20,000-250,000 (US\$ 13-161)	87%
				100%

\*PDA-Personal Digital Assistants

\*\*WAP-Wireless Application Protocol

Exchange Rate: One US\$ = Tshs. 1,550 as at June 2011

The mean cost of the mobile phones the learners owned was Tshs. 90,000/= (US\$ 58) with a range of 10,000 to 300,000 Tanzania shillings. The few that indicated that they own high capacity mobile devices such as palmtop computer, compacq Ipaq (PDA) WAP telephone and smart phone may not have known what these devices are. In their response to a question: “what was the cost of the mobile phone you are using?” They indicated cost prices ranging from Tshs. 20,000 to 300,000. This price range is way below the market prices of these devices, an indication that what they had were ordinary cell phones.

The implications of these findings on teaching and learning is that limited information including short article abstracts of up to 150-160 words can be sent as text messages to the learners by the tutors or the institution. In short, the results suggest that while mobile phones

are affordable and hence accessible to the majority of learners, the capacity of the type of phones owned are of limited pedagogical use. This situation calls for the blending of the use of mobile phones with other delivery modes including the print that is currently the predominant mode at the Open University of Tanzania. Indeed, given the ICT penetration trend in the country, there is a need to integrate mobile technologies with other distance learning technologies such as radio, television and DVDs that are readily accessible to remote and socially disadvantaged learners. This is a practice in the National Open University of Nigeria (Ajada, Salawu & Adeoye, 2008). The blending of radio, TV, print and mobile phone has been more successful than online learning approach in the provision of distance learning in the Asian continent (Bandalaria, 2007; McQuaide, 2009).

### *Level of Usage*

One other aspect of the mobile phone investigated was the level of use. Table 5 shows that the student-student and student-tutor mobile communications on academic and administrative issues are relatively low. Indeed, 55.3% indicated that they have never been contacted by the University through mobile phone. For the few who have been contacted by the University through mobile phone, information on who initiated the phone contact was not investigated.

**Table 5: Frequency of Student-Student and Student-Tutor Contacts**

Frequency (Contacts per Month)	Type of Contacts				
	Student-Student		Student-Tutor		Total
	n	%	n	%	
1-6	22	29%	38	49%	60
7-12	8	10%	5	6%	13
13-18	8	10%	2	3%	10
19-24	8	10%	2	3%	10
25-30	4	5%	0	0%	4
31 and +	22	29%	1	1%	23
Missing	5	7%	29	38%	34
Total	77	100%	77	100%	154

While mobile phones are affordable, Table 6 shows that sustainability of the running cost is a big challenge to the learners. Learners reported that they spend approximately Tshs. 4,000/= per call/day. Those learners, who contact fellow students or tutors at the lower end of the scale, between 1-6 times per month, will need to spend between Tshs. 4,000 and 24,000 per month. In economic terms, an individual's level of expenditure is significantly related to his or her level of disposable income. Applying this principle, learners cannot spend the money they do not have. The situation explains in part the low student-student and student-tutor interactions by use of this learning mode.

The low rate of student-tutor interactions may have hidden and wider implications. The principle behind the employment of the blended teaching and learning strategy in ODL is to enhance the learning opportunities and improve the throughput rate and performance of the learners. The Open University of Tanzania is yet to identify the factors behind the low throughput rate of students. Could the low tutor-student interactions significantly account for low student throughput rate? Interestingly, students spend more money communicating with fellow students than with the tutors, as measured by 29% and 1% rate of 31 and over contacts per month, respectively. Why is this trend? Do students find more benefits interacting among themselves than with their course tutors?

There are two elements that were not investigated in this study and which may influence the mobile use costs. These are:

- *The mode of the contact.* If the mode is through SMS, the cost may be lower. If the mode is discussion over the phone, the cost may be quite high.
- *The culture of the people.* In Tanzania and possibly in many other African communities, where discussion are involved, it is uncultured to go straight to the topic and therefore the niceties and pleasantries that precede the discussion of the subject matter will cost money and hence is a hidden cost to the learner.

### ***Opportunities and Challenges***

Mobile phones present both the opportunities and the challenges to the learners and the programme providers. Table 6 summarises the opportunities that mobile phones provide and the challenges the learners face with the use of mobile phones. Based on the frequency counts, these opportunities and challenges are presented in the ranking order where the enhancement of learning and the running cost are ranked high as opportunities and the primary impediment to the extensive use of mobile phone, respectively.

**Table 6: Ranking Order of Opportunities and Challenges Identified**

<b>Opportunities</b>	<b>% Ranking</b>	<b>Challenges</b>	<b>% Ranking</b>
• Enhancing learning	• 28%	• High running cost	• 45%
• Easier and quicker communication	• 26%	• Poor network	• 35%
• Cost-saving on travel and time	• 27%	• Low storage capacity and small screen size	• 7%
• Miscellaneous	• 18%	• Abuse	• 3%
		• Power supply and reliability	• 3%
		• Miscellaneous	• 7%

### ***Techno-cultural Norms***

While m-learning has the potential to supplement and enhance print-based distance learning, there may be impediments in realising this potential. As an “a”-learning device, the adoption of mobile phone use for instructional delivery by an institution calls for its accommodation and assimilation by the parties involved. In Piaget’s conception, accommodation of a new practice is more difficult than its assimilation. This new practice of mobile learning has implications on cost and invasion of privacy. As shown in Table 6 mobile phone operation costs pose the greatest challenge to the learners. Some costs arise out of the failure of a third party to act promptly and expeditiously provide the information required by the learner. One respondent observed that:

*“It is not easy to contact the Open University officers due to the fact that most of them don’t respond easily and they don’t give proper answers for example on the issue of uploading marks for the Teacher Education Project course”.*

This situation burdens the learners with additional costs. First, learner incurs repeated mobile phone call costs by trying to access those responsible for their academic matters. Second, failure of the mobile communication may force the learner to incur travel cost to the University to seek feedback he/she could have received over the cell phone. As pointed out

by Librero *et al.*, (2007:240), the “*transportation costs saved by SMS use could be reallocated to the cell phone credits used for learning*”.

The use of mobile phones requires behaviour change if it has to achieve its intended purpose. The learners observed that mobile phone use has both positive and negative outcomes. Here are typical reactions from the sample studied:

Positive outcomes:

- “*It will enhance learning and save time. Instead of going to the office [The Open University of Tanzania office] and hang on the corridors I will use my phone only*”.
- “*People should develop the culture of using their mobile phones...It is fast to learn using mobile phones especially those with internet. You can search materials easily and there is no need of using desktop or laptop computers*”.
- “*Each department should list their tutors’ mobile phone numbers so as to enable students to access them...*”

Negative outcomes:

- “*If mobile phone will be used they should be on at all times. If teachers (lecturers) will be switching off their phones it will cause frustration to students.*”
- “*Use of mobile is too confidential. It may cause embarrassment to uncommitted teachers and students*”.
- “*It could be useful if and only if the lecturers could be sharp in responding to students...but instead a call may continue and eventually stop without a response*”.

#### *Re-defining “Cheap” Perception*

These results challenge the commonly held notion that mobile phone operation is cheap. They raise one fundamental question: “from whose point of view do we say mobile phones and use are cheap?” Interpretation of this “cheapness” notion arises *inter alia* from:

- The fact that it cost less to acquire the lowest quality of a mobile phone and one can spend little by little at a time in communication. The mobile phone airtime cost is as low as half a Tanzania shilling per second. This little by little expenditure among the low socio-economic group creates an impression that it is cheap to operate mobile phones.
- Those with high disposable income such as those in large scale business and high income levels see mobile phone operation as cheap as they are able to compare mobile costs with the costs they incur in operating other ICT devices they own. In view of their high disposal income and high consumption pattern this group provides a skewed perception of what is considered to be “cheap”.
- The service providers’ marketing strategies that are driven by profit motive to secure wide market base. For example, an advertisement that states “robo shilingi ya ukweli” meaning “a quarter shilling for real”. While there is no item you can buy with a quarter shilling, the duration for the value of a quarter shilling or couple of quarters of a shilling is a hidden cost.

The suggested interventions to enhance effective usability of mobile phone include *inter alia*:

- Reduction of the service charge (airtime) and phone cost, and
- Training the learners on the multiple functionalities of a mobile phone.

While the second intervention is feasible in that the programme providers can train the learners on how to maximise on the in-built functionalities of a mobile phone such as access to internet, radio recorder, entertainment and teleconferencing, the second suggestion faces two major barriers: the uncontrolled market forces and the current Government

attention that largely leans towards the promotion of online learning rather than m-learning. Even in a situation where the service provider or the manufacturer customises the functionalities of mobile phone to accommodate only m-learning activities, this may only affect the purchase cost of the phone rather than the operational cost.

## CONCLUSION

The conclusion drawn from this exploratory study sheds light on the effectiveness of mobile phone-facilitated distance learning in Tanzania. From an ODL perspective, the development of mobile technologies has made access and the delivery of information to learners and trainees in remote locations easier and quicker. Though the rate and the magnitude of e-learning usage is not uniform across the globe, m-learning as a subset of e-learning is becoming the primary driver of “a”-learning (anytime, anyplace, anywhere learning) in other parts of the world. From the experiments and studies that have been conducted in developing countries, it is clear that mobile phone is one of the many student support services. It’s capability of both synchronous and asynchronous communications helps a learner in a remote location to do many things including: registration for face-to-face sessions; enquiring about study materials and assignments; and asking their tutors questions (Brown, 2003; Hendrikz, 2008).

Despite these benefits, the overall maximum usability of mobile technology in the African context for instructional delivery remains marginal. Indications from the learners involved in this study are that the running costs for large scale use of mobile technology are unsustainable and this situation may be unlikely to improve in the next decade. The rising poverty in Africa shows that “*four out of 10 Africans live in absolute poverty... and poverty is on the increase*” (Ayittey, 2002: 57). This situation predisposes a good number of African countries to the receiving end of second-rate and low capacity mobile technologies. The future choice of many African countries will be between feeding the people and investing in educational technology. For political expediency feeding the people may be given priority over other competing needs. In Tanzania, the current Government priority is “*Kilimo Kwanza*”-meaning “agriculture first”. The priority direction has not changed much since the early years of independence 50 years ago when the ruling party’s political slogan and symbol then was “*jembe na nyumba*” (meaning “a hoe and a house”) - an indication of priority being placed on the provision of basic human needs of food and shelter.

Overall, mobile use in Tanzania by distance learners largely supports Brown’s (2003) observations with respect to the level of its usability, cost-effectiveness from the learners’ perspectives and limitations as a primary mode of education or contents delivery. This study showed that the current mobile phones owned by majority of the distance learners have limited capacity to handle large data and hence rendering them less useful for extensive pedagogical purposes. If the learners cannot afford high capacity mobile phones, educational providers and in particular the ODL providers become impotent in the application and use of high capacity mobile technology to deliver instructions to them. The sender and the receiver need devices with equal communication capacities. With low capacity, mobile phones remain as Brown (2003) argues for the delivery of limited information to the learners rather than for the delivery of primary course content. Further, the quality assurance of instructions through mobile phones may pose a big challenge (Hendrikz, 2008). Where a tutor is in-charge of a course with a large student enrollment say over 1000 learners the administration of SMS communications from the learners may require a technology backup for both the storage and retrieval of in-coming and outgoing messages. It is also apparent that an ODL provider who intends to use mobile phone devices for instructional delivery needs to consider staff sensitisation on behaviour change.

Though the study results are based on real-world data, the study has three key limitations. First, the data were collected through convenience sampling and this approach may have led to sampling biases. Second, the two selected urban sample sites, Dar es Salaam and Iringa, may not capture urban-rural digital divide on mobile phone use and operational cost. Third, the present study was intended as an exploratory study on the degree to which mobile phones are currently used by the distance learners of the Open University of Tanzania on their programme related matters. In this regard, a 14-item instrument with half of the items covering demographic information cannot be said to be adequate to cover the entire spectrum of issues in M-learning. In this regard, basic information was gathered.

The efficacy of mobile technologies from pedagogical approach needs further research. In addition to the collection of quantitative data through questionnaires, in-depth face-to-face interviews need to be conducted with both the learners and the tutors. The key variables that need to be included in future research are: communication cost implication to the learners and the institution, technological requirements for information management, cultural influence on mobile phone use, cost, students' avoidance of course tutors contacts and quality assurance of m-learning vis-à-vis the delivery of instructions through the types of mobile devices that are affordable to the learners.

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