



## Prospect of Global System for Mobile Communications for Conservation Education and Awareness in Nigeria

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**ABSTRACT:** The need for information and communication medium that is capable of reaching vast majority of the public with messages necessary to encourage positive environmental and conservation attitudes and behavior is of greater importance more than ever before. This study examined the prospect of GSM as a tool for conservation education and awareness in Nigeria. The study was conducted at Osun State University, Nigeria. Forty-two percent (42%) of the staff and students of College of Agriculture of the University was sampled using self-administered structured questionnaires. Data were presented descriptively while hypotheses were tested with Chi-square and T-test. The mean age of the respondents was 25.1 years, 51.1% were female while 58% had more than one GSM lines. Furthermore, 61.4% of the respondents confirmed receiving the environmental/conservation messages from MTN network while 42.6% could recall the name of organization responsible for the messages and 68.5% could recall bush burning. Among the respondents that could recall, 45.9% and 54.1%, 47.4% and 52.6%, 33.3% and 66.7%, 57.1% and 42.9%, and 50.0% could recall bush burning, deforestation, planting of trees, using energy-saving bulbs and stoves and saving the environment respectively after 6 and 12 months. The study shows that GSM has high prospect as a tool for conservation and environmental education in Nigeria.

**Keywords:** GSM, conservation, education, awareness, potential

JoST. 2015. 6(1): 93-103.

Accepted for Publication, April 15, 2015

### INTRODUCTION

According to the Millennium Development Goal (United Nations, 2010), everyone in the world depends on natural ecosystems to provide the resources for a healthy and secured life. Humans have made unprecedented changes in ecosystems in recent decades to meet their expanding populations and booming economy. Human activities have taken the planet to the edge of a substantial wave of species extinctions, further threatening our own well-being. The pressures on water, air, and natural ecosystems will increase globally in coming decades unless human attitudes and actions change (United Nations, 2010).

Increasing economic activities in developing countries result in more energy and consumption demand, which generally lead to environmental degradation (Economic Commission for Latin America and the Caribbean, ECLAC, 2000). There is a conventional belief that such environmental degradation would resolve as soon as these countries grow economically since that would enable them to afford environmental friendly technology as well as pro-environmental regulations and policies. However, several studies indicated that many developing countries already equipped with environmental policies, legal frameworks and economic

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instruments, which are regarded as highly sophisticated by international standards (Nishira *et al.*, 1997; Huber *et al.*, 1998) and still face worsening environmental conditions (ECLAC, 2000).

Environmental degradation is a common global problem, but strategies to halt it must be contextually specific if they are to be effective (Dongtotsang and Sagun, 2006). Experience indicates that solutions emerge whenever people are aware and involved in solving their problems (United Nations Environment Programme, 2001). The communication challenge for biodiversity issues exists on multiple levels: the complexity of the problems and solutions regarding biodiversity loss, the urgency of the issue, and the competition with other urgent social issues in the media and social discourse (Farrior, 2005). Current communication strategies take an audience-centred approach in order to be more effective, recognizing that people have different values and myriad ways of engaging with the natural world. A variety of strategy is needed for the whole array of solutions—from individual behavioural change to public policy change (Farrior, 2005). One of the variables of behavioural change is knowledge (Huitt, 1999, Schneider and Cheslock, 2003). The role of education in understanding, protecting, and solving environment problems has been universally recognized since 1970 (Shobeiri *et al.*, 2006). It has also been argued that the most effective ways of tackling environmental problems is through spreading awareness and empowering people, which would enable them to take decisions on their own. Based on these decisions, they would initiate actions beneficial to themselves as well as to the local environment (United Nations Environment Programme, 2001).

Conservation agencies in developing countries, particularly in Nigeria, are facing unprecedented challenges in natural resources management. This presents significant opportunities to benefit from evolution of technologies and practices

with the potential for significant improvements to communications and the use of the information and communications technologies (ICTs) (USAID, 2012). Technology can be used to provide information and prompt reflection, connect like-minded people, and empower citizens to participate (Holgar *et al.*, 2009). Another important aspect is that of using technology to develop richer stories around products, to strengthen and make more sustainable user-object relationships (Holgar *et al.*, 2009). Some observers highlight the many countries across the African continent that are now ‘leapfrogging’ older technologies (Banks and Burge, 2004). Mobile phones and other wireless technologies are often the preferred options (Charney, 2003). The personal use of mobile telephones and related technologies has increased markedly since the late 1960s (Chen *et al.*, 2000; Ling and Vaage, 2000; Lundby, 2002; Roschelle and Pea, 2002). Their impact has been felt across the board, no less so in rural areas (IDRC, 2003). Mobile phone is no longer regarded just as a communication tool, but a powerful networked platform (Holgar *et al.*, 2009). Paulos *et al.* (2009) championed this new role, encouraging a celebration of the mobile phone as a personal measurement instrument capable of sensing our natural environment and empowering collective action through everyday grassroots citizen science across blocks, neighbourhoods, cities, and nations (Holgar *et al.*, 2009).

Mobile phones have fundamentally changed how we communicate in society. They have become a dominant technology in the developed world (Banks and Burge, 2004), and fast becoming an important tool for development in developing countries. Although mobile phone enables us to speak from wherever we are to others thousands of kilometers away (Paas and Creech, 2008), its application worldwide has been varied, ranging from business services to sustainable development activities. As the focus is being shifted from the information society to

the knowledge society and policies promoting connectedness (Paas and Creech, 2008), there is a paradigm shift in methods and technologies through which knowledge and connectedness are maintained for development and sustainability. The ICT, particularly the mobile phone is helping to promote new ways of interacting in order to facilitate the learning that emphasizes not just knowledge, but choices, values and actions (Paas and Creech, 2008). In many development efforts, a man cannot participate actively in history, society, in the transformation of his reality, if he is not helped to become aware of reality and his own capacity to transform (Freire, 1977 in Otterloo, 2003). The common use of telephones and messaging for facilitating friendships and socialization (Taylor and Harper, 2002, Bauman, 2003) has established a role for the mobile telephone as a means of collaborative learning (Uzunboylu *et al.*, 2009). Using the SMS technology is an ideal and accessible way for the public to take action as well as increase their awareness of environmental issues (Dongtotsang and Sagun, 2006). However, Low literacy rates, diverse indigenous languages, limited electricity, strong oral traditions, and nomadic lifestyles or livelihoods are some of the contributing factors that make it difficult for communities in developing countries to adopt certain ICT tools (Sinha, 2005). One of the major impacts mobile phones had in less-developed countries in the Southern hemisphere is its capacity to include partly illiterate mass populations, who will never have the means to buy computer and who hitherto were not even connected to the traditional networks of land line phones (Townsend, 2000). As such, mobile telephony presents itself as relevant means of two-way communication for a vast number of marginalized communities in the world (Sinha, 2005). The introduction of the Global System of Mobile Communications in 2001 has changed the entire scope and application of information communication technology in Nigeria. From less

than 500,000 mobile lines in 2001, the growth of GSM lines in Nigeria is unprecedented in sub-Saharan Africa, presently ranging about 80 million-100 million subscribers from around 150 million people. According to FAO (2003), the revolution in information and communication technologies is profound; countries with collapsing telecommunication infrastructures can utilize cell phones and provide phone service to isolated rural areas. New communication technologies have also increased the possibilities to marginalized communities to access information, and to have their voices heard from local to global levels (FAO, 2003). Since the introduction of GSM to Nigeria in 2001, mobile phone has become a powerful tool for communicating across the country among both the young and the old people, as it has been changing the lifestyle of people (Taiwo, 2010). Among all the features of GSM, SMS function or text messaging has become a popular means of communication among Nigerians because it is inexpensive (Taiwo, 2010). Although, various studies have been conducted on the perception and application of mobile phone in Nigeria (Elegbeleye, 2005; Ajiboye *et al.*, 2007; Ifejika *et al.*, 2009; Akadiri *et al.*, 2009; Taiwo, 2010; Bakare & Gold, 2011), there has been no known study; however, that has investigated its practical application and prospect for conservation education and awareness in Nigeria. This study was therefore carried out in order to examine the potential of GSM for conservation education and awareness in Nigeria. It was hypothesized that 1) ability to recall the environmental/conservation messages received through GSM network is significantly related to demographic attributes of age, gender, status of respondents and month of interview, and 2) there is no significant difference between the respondents' ability to recall environmental/conservation messages and interval of time the message was received from GSM network, status and gender of respondents.

**MATERIALS AND METHODS**

***The Study Area***

The study was conducted at the College of Agriculture, Osun State University, Ejigbo Campus, Ejigbo, Nigeria. Ejigbo campus is one of the six campuses of the University which was established pursuant to the University Establishment Law passed by the State House of Assembly in December, 2006 (Osun State University, 2015). Osun State covers an area of approximately 14,875 square kilometers, lies between longitude 04<sup>o</sup> 30<sup>1</sup>E and latitude of 07<sup>o</sup> 30<sup>1</sup>N. It is bounded by Ogun State to the south, Kwara State to the north, Oyo State to the west and Ekiti and Ondo State to the east (Osun State Government, 2015). According to the 2006 National Population Census, the population of the State is 3,423,535 (Osun State Government, 2015).

***Methods of Data Collection***

The sample population was the staff and students of the College. The staff were categorized into academic and non-academic staff, while the students were categorized based on their level of studies (i.e. 100-400 levels).

Overall, the total population of study was 210, comprising 148 students and 62 staff, from which 88 people (42%) (i.e. 60 students and 28 staff) were sampled. The selected population was through random sampling while data were collected through self-administered questionnaires. The questionnaires were administered at two intervals- 6 and 12 months after the messages were sent to the public via SMS call me back (Table 1). Each of the respondents was first presented with the questionnaire. Once the questions have been answered, the respondent was then shown the two text messages on the environment/conservation sent in December 2009 to the public through one of the GSM providers (i.e. MTN Communication Limited). This is to confirm whether each respondent received any of the messages and thus determine their ability to recall the messages. The respondents that took part in the first administration of questionnaire were excluded from the second administration of questionnaires. Variables measured were age, which was measured in years, gender was measured as 1= male, 2= female, status of

**Table 1: Sample Selection Procedure**

<b>Status</b>	<b>Total Number</b>	<b>Number Selected</b>
<u>Staff</u>	26	13
Academic		
Non Academic	36	15
<u>Students</u>		
100 Level	75	22
200 „	37	19
300 „	14	6
400 „	22	13
Total	210	88
%	100	42
Interview Interval (Months)		
6 months after message was transmitted through GSM network	46	52.3
12 months after message was transmitted through GSM network	42	47.7

respondents was measured as 1=staff, 2=student while month was measured as 1=6 months after the receipt of environmental messages and 2= 12 months after the receipt of

environmental messages. Data analysis was through descriptive statistics such as tables, frequencies, and percentages, and inferential statistics such as Chi-square analysis and T-Test.

## RESULTS AND DISCUSSION

### *Socio-economic characteristics*

The demographic characteristics of the respondents are presented in Table 2. The mean age of the respondents was 25.1 years with majority between 21-40 years of age. The median age was higher than the estimated median age of 18.2 years for Nigeria (CIA, 2015). The age structure is consistent with CIA (2015) which puts 25-54 years as the second dominant age structure for the country. Also, 51.1% were female while 48.9% were male which is inconsistent with the national estimated sex ratio of 1.04 male(s)/female (CIA, 2015). Furthermore, 68.2% of the respondents were students, 42.0% had one GSM line while 58% had more than one GSM lines. This is consistent with findings of Odunaike *et al.* (2007) that reported 42.2% of their respondents having more than GSM networks.

### *Description of GSM Services*

The language of receiving information or calls by the respondents was both English and Yoruba. In addition, non-advert messages were occasionally received by all the respondents, which is an indication that the GSM providers are primarily interested in advertising their products and that public agencies occasionally use GSM platforms to inform the public on their activities. Environmental issues constituted the highest information occasionally received by respondents with 35.2%, followed by sports (27.3%). Also, non-advert messages were sent to the public largely through recharge and account balance services (25%) and call me back services (23.9%) (Table 3), this might be because these services are toll free and are basic services for providing information to their customers.

**Table 2: Socio-economic characteristics of the respondents**

Variable	Frequency	%	Mean
<u>Age</u>			
1-20	35	39.8	
21-40	47	53.4	25.1
>40	6	6.8	
<u>Gender</u>			
Male	43	48.9	
Female	45	51.2	
<u>Education</u>			
Secondary	1	1.1	
*NCE/Diploma	4	4.5	
BSC/*HND	10	11.4	
MSc	7	8.0	
Ph.D	6	6.8	
Students	60	68.2	
<u>No of GSM lines possessed</u>			
1	37	42.0	2
>1	51	58.0	

\*NCE=Nigeria Certificate in Education HND=Higher National Diploma

**Table 3: Description of GSM service by the respondents (N=88)**

Variable	Frequency	%
<b>Preferred language of communication</b>		
English only	0	0
Yoruba only	0	0
English and Yoruba	88	100
<b>Frequency of non-advert messages</b>		
Occasionally	88	100
<b>Themes of non-advert communications</b>		
Health	16	18.2
Education	11	12.5
Environment	31	35.2
Finance	6	6.8
Sports	24	27.5
<b>Mode of communicating non-advert messages</b>		
Call me back service	21	23.7
Recharge service	22	25.0
Account balance service	22	25.0
Customer service	9	10.2
Send me credit service	10	11.4
Dedicated codes	4	4.5

**Receipt and Ability to Recall environmental/Conservation Information**

Furthermore, 61.4% of the respondents confirmed their receipt of the environmental messages while 38.6% did not (Figure 1). However, 42.6% of them could recollect the name of organisation responsible for the messages on environment received through one of the GSM providers (i.e. MTN). Bush burning had the highest rate of recall with 68.5% of those that confirmed the receipt of the messages (Figure 2). When the ability to recall information was categorized based on months of interview

(i.e. after the messages were sent to the public through GSM provider), those who could recall information on using energy saving bulbs and stoves were 57.1%, while 50% recalled information on saving the environment. In addition, 47.4% and 45.9% recalled information on deforestation/cutting down of trees and bush burning respectively while 33.3% recalled information on planting of trees. After 12 months of receipt of information from MTN, 54.1% recalled information on bush burning, 52.6% deforestation, 66.7% planting of trees, 50% saving the environment, and 42.9% use of

**Table 4: Frequency of recall of environmental/conservation themes by months**

Themes	*After 6 months (%)	*After 12 months (%)
Bush burning	45.9	54.1
Deforestation/cutting down of trees	47.4	52.6
Planting of trees	33.3	66.7
Using energy saving bulbs and stoves	57.1	42.9
Saving the environment	50.0	50.0

\*Multiple responses recorded

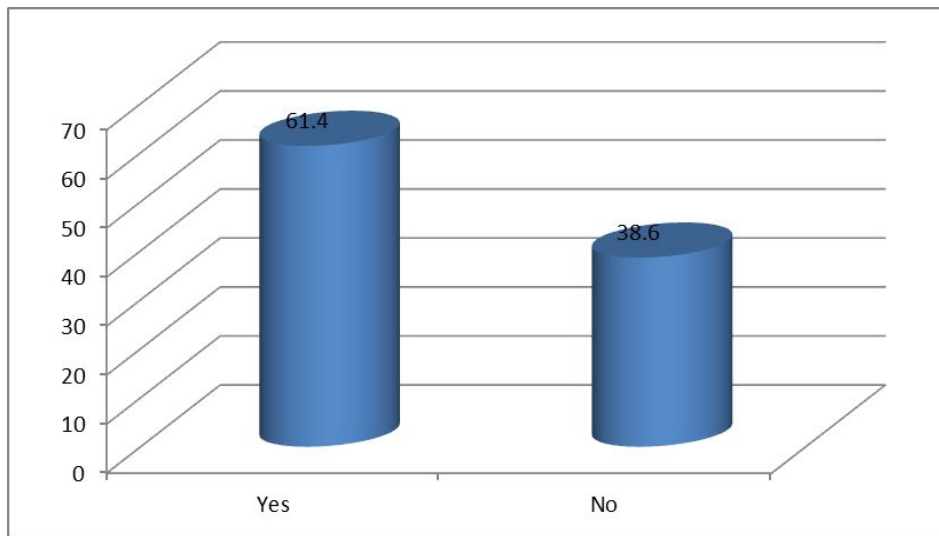


Figure 1: Respondents' receipt of environmental conservation messages

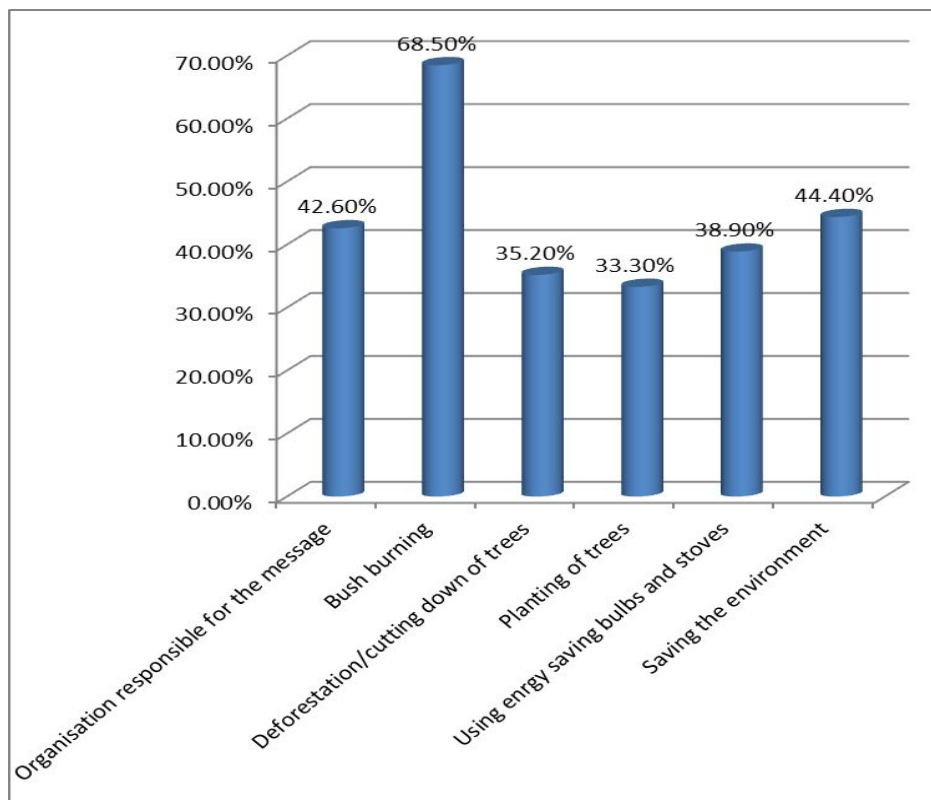


Figure 2: Respondents' ability to recall environmental/conservation messages

energy-saving bulbs and stoves (Table 4). This is an indication that ability to recall the themes of the environmental messages received through the GSM may not be dependent on the length of time the messages were received by the public.

**Hypotheses Testing**

The result shows that only gender had significant association ( $\chi^2 = 17.57, p < 0.01$ ) with the ability of the respondents to recall environmental messages received through GSM provider. However, all other variables such as age, respondents' status and month of the interview after the receipt of the messages had

no significant association ( $p > 0.05$ ) with the respondents' ability to recall the messages (Table 5). Furthermore, there was no significant difference ( $p > 0.05$ ) in the respondents' ability to recall environmental messages based on month of interview, status of respondents and gender. The implication of these is that regardless of months the information on the environment is received by the respondents, their status and gender, there is no difference in their ability to recall environmental/conservation information received through GSM, thus, there is great potential of the GSM platforms as a tool for environmental education and awareness in Nigeria.

**Table 5: Relationship between ability to recall environmental/conservation information and the selected socio-economic variables**

Variable	$\chi^2$	P	Decision
Age	1.31	0.86	NS
Gender	17.57	0.007	S
Status	6.64	0.36	NS
Month of interview	6.58	0.36	NS

**Table 6: Differences in respondents' ability to recall environmental messages**

Variable	Mean Difference	T	Significance	Decision
Month of interview	-0.15	-0.40	0.69	NS
Status	0.80	0.20	0.84	NS
Gender	0.17	0.47	0.64	NS

**CONCLUSION AND RECOMMENDATIONS**

This study has shown that the global system of mobile communications (GSM) has a great prospect as a tool for environmental conservation education and awareness because the ability to recall environmental messages and information was relatively high. Agencies of government, particularly the Nigeria National Park Service, Federal Ministry of Environment,

and other conservation agencies at both state and local government levels, as well as non-governmental organisations (NGOs) on environment should take advantage of the features of the GSM communications platform observed in this study by harnessing it as a tool for conservation and sustainability awareness and education in Nigeria.

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