Use of mobile phones for the awareness of climate change in Kuje Area Council, Abuja Nigeria

L'utilisation des téléphones portables pour la sensibilisation au changement climatique au Conseil régional de Kuje, Abuja Nigeria

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Abstract

The project explored use of mobile phone for the awareness of climate change Kuje Area Council, Abuja Nigeria. The research was motivated by bush and waste burning, deforestation, cooking with fire woods and coals in Kuje Area Council which are dominant contributors to climate change. A total of 80 residents of Kuje (40 males and 40 females) participated in a six week programme voluntarily. In the course of the programme, text messages, e-mails, pictures and jingles warning against climate change were sent out with the help of mobile phones. Data were collected from the participants using structured questionnaire which was validated through peer review and pilot testing. Data collected were analyzed using a paired t-test, an independent t-test and Turkey's HSD test. The various ways of maintaining clean and conducive environments were learnt by participants, which impacted positively on their awareness of climate change. Results showed that the participants' knowledge of mobile phone learning increased significantly and there was a significant difference between the genders in the pre-project test (P=0.05). It is recommended that mobile phone should be used as a medium of climate change awareness. Similarly, participants should be given the opportunities that enable them to engage in other m-learning activities.

Key words: conducive environment, deforestation, phone providers, stakeholders, educational projects

Résumé

Le projet a exploré l'utilisation du téléphone mobile dans la sensibilisation au changement climatique des habitants de Conseil de Région Kuje, Abuja le Nigeria. La recherche a été motivée par les incendies de forêt, l'incinération des déchets, le déboisement, la cuisson au feu de bois et de charbon dans le Conseil de Région Kuje qui sont des facteurs dominants du changement climatique. Un total de 80 résidents de Kuje (40 mâles et 40 femelles) a participé volontairement à un programme de six semaines. Au cours du programme, des textos, des courriels, des images et des jingles mettant en garde contre le changement climatique ont été envoyés avec l'aide de téléphones portables. Des données ont été recueillies des participants utilisant le questionnaire structuré qui a été validé par la révision par les pairs et le test de pilotage. Les données recueillies ont été analysées en utilisant un test t apparié, un test t indépendant et le test HSD turque.

Les participants ont appris diverses manières de maintenir l'environnement propre et propice, ce qui ont eu un impact sur leur prise de conscience par rapport au changement climatique. Les résultats ont montré que les connaissances des participants en matière d'apprentissage par téléphone mobile ont considérablement augmenté et il y avait une différence significative entre les genres dans le test (P=0.05) du préprojet. Il est recommandé que le téléphone mobile soit utilisé comme un médium d'éveil des consciences sur le changement climatique. De même on devrait donner aux participants l'opportunités de participer à d'autres activités d'apprentissage par téléphonie mobile.

Mots-clés: environnement propice, déforestation, fournisseurs de téléphones, parties prenantes, projets éducatifs

Introduction

The term climate change is often mentioned in public discussions both in formal and informal education. In keeping with this, Mendelsohn and Williams (2006) defined climate change as challenges affecting environmental, social and economic sectors worldwide. Knutson (2011) inferred that climate change research is a broad and challenging area due to its impact on the planet. Climate change can pose challenges toward sustainable development, and this was seen recently in the just concluded world climate change conference 2019, organized by United Nations in New York that attracted world leaders just to appraise, share ideas and find solutions to climate change as it affects all globally.

Extensive work had been done on climate change by various researchers. Climate change had been reported to pose a huge hindrance to developing countries, thus preventing them from attaining sustainable development

(Adebayo *et al*., 2013; Spellman *et al.*, 2013; Gameda and Akalu, 2015). According to Harbinson *et al.* (2006), climate change is a key challenge to global development. This led some climate change activists from different parts of the world to lend their voices urging world leaders particularly those of industrialized nations to help and make sure that Carbon (IV) Oxide emission is reduced to the barest minimum. Canadel, *et al*. (2010) reported increased atmospheric greenhouse gas concentration due to industrial pollution. In another development, deforestation was found to reduce the rate of carbon absorption leading to global warming (Intergovernmental Panel on Climate Change (IPCC), 2007). Climate change impacts negatively on the ecosystem; plants, animals, land and water bodies (Pitpitunge, 2013). Climate change has thus become a global concern due to its adverse effects on all sectors.

Mobile phone learning is also referred to simply as 'm-learning. Mobile learning can be described as a learning that is not fixed and that is also supported by digital devices. On one hand, it is learning that is relevant to the context and location of the student. Mobile learning involves the learner and a portable digital device (or devices) with which to access the learning content. It is accessible from virtually anywhere, thus its usage is very convenient. Sharing is almost instantaneous among everyone using the same content, hence reception of instant feedback. Information and Communication Technologies (ICTs) are of significant importance in search of lasting solutions to the negative impacts resulting from climate change (Shafiq *et al*, 2014 and Sala, 2010). Mobile phones are cost effective, with high memory which enhance fast communication rate (Chakraborty *et al*. 2017; Islam *et al*, 2010; Heeks, 2010). There is an increased rate of mobile phone usage in respect to solving the adverse effects of climate change globally especially in developing countries (Taylor and Harper 2002; Bauman, 2003; Chanawongse, 2009 and Wattegama, 2007). Kuje was used for the study because of the high rate of mobile phone penetration there and its location as an agricultural hob. It has a large span of arable land for cultivation and animal husbandry which are susceptible to adverse effects of severe climate change.

Objectives of the research
   i.   To quantify the use of mobile phone to increase the participants' knowledge of m- learning.
   ii. To create climate change awareness in Kuje Area Council through mobile phone learning.
   iii. To determine the role of gender in climate change awareness using mobile phone learning.

Research Questions (RQ)
Rq1: Will the project increase the participants' knowledge of mobile phone

learning?

RQ2: Will the project increase the participants' knowledge of usefulness of mobile phone learning in creating climate change awareness?

Rq3: Will the project increase the participants' knowledge of the role of gender in mobile phone learning and climate change?

Hypotheses

Ho1: There is no significant difference between males and females in their awareness of mobile phone learning.

Ho2: There is no significant difference between males and females in their awareness of usefulness of mobile phone learning in creating climate change awareness.

Materials and Methods
Study Site

Abuja consists of six area councils which are Local Government Areas equivalence. The area councils include Abuja Municipal Area Council (AMAC), Abaji, Bwari, Gwagwalada, Kuje and Kwali. The area councils can further be sub-divided into district and areas, Abuja has a land area of 7,753.9 km^2

The study was carried out at Kuje Area Council; an urban area where people emigrate to from different areas for different reasons including socio-economic needs, like formal and informal jobs, business and agriculture.
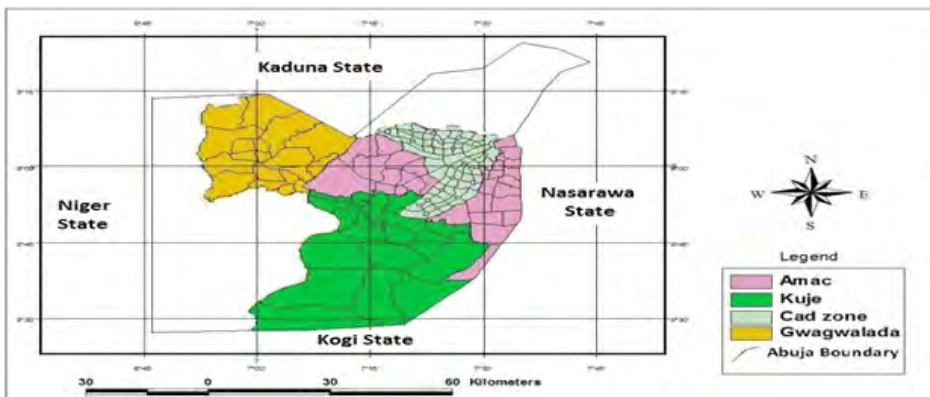

Figure 1: Map Showing Abuja Municipal, Kuje and Gwagwalada Area Councils

Source: Department of Geography and Environmental Management, University of Abuja

Research Design
This study is a descriptive survey design comparing male and female folks in the level of awareness of m-learning and in usefulness of mobile phone learning in creating climate change awareness in Kuje Area Council, Abuja using survey design.

Participants
Eighty (80) people participated; 40 males and 40 females mainly youths between the age of 20-35 years were involved, being the age group that use smartphone most globally. A six-week project and training was organized for the participants between April and May, 2019. Language used for instruction and training on how to access the information on phone was pidgin English.

Research Instrument
The instruments used for data collection include a package of text messages, jingles and photographs and personal interviews using structured questionnaires, titled 'Usefulness of Mobile Learning" (UML). The questionnaire was made up of two sections; first section assessed the socio-economic characteristics of the participants and the second section had 17 Likert type items designed to assess the impact of climate change on Kuje Area council community and their environment. The questionnaire was moderated by experts in measurement and evaluation to improve its quality before administration. The test-reset reliability scale yielded reliability coefficient of 0.83. The questionnaire was administered to the participants before the beginning of the project (pre-project) and at the end of the project (post-project).

Analysis of Results
Data collected were analyzed using a paired t-test, an independent t-test sample and Turkey's HSD test at 5% significance.

Procedure
Permission was obtained from the community heads in Kuje Area Council; Abuja to carry out the project. Interested participants were enrolled and briefed on the aim and objectives of the study. The participants were first enlightened on how to access text messages, electronic mails, jingles and photographs on mobile phones. This was followed by a pre-test to access the level of the participants' awareness of mobile learning and its usefulness in creating climate change awareness.

In the following six weeks, the participants were exposed to text messages, jingles and photographs on climate change via their mobile phones. The participants after a careful study of these responded through SMS and

electronic mails. The participants meet on weekends for formal discussions, suggesting measures of combating the adverse effects of climate change with the researchers' assistance. A post-test was conducted on concluding the project, during which the questionnaire was administered a second time.

Results and Discussion

RQ1: Will the project increase the participants' knowledge of mobile phone learning?

Table 1: Paired t-test for the means on the UML

UML	Mean	Total	Standard Deviation	Mean difference	t	Significance(P≤0.05)
Pre-project	64.2	80	24.34	- 34.5	1.99	≤ 0.05
Post-project	98.7	80	12.17			

Pre-project mean was 64.2 (SD = 24.34) and post-project mean was 98.7 (SD = 12.17) while the mean difference was 34.5 (Table 1). There was significant difference in the values (t_{80} = 1.99), thus there was a significant increase in the mobile phone learning knowledge of the participants.

RQ2: Will the project increase the participants' knowledge of usefulness of mobile phone learning in creating climate change awareness?

Hypotheses

Ho1: There is no significant difference between male and female participants in their awareness of mobile phone learning after exposure to six week program.

Table 2 shows the descriptive statistics from the UML with regard to gender. The mean post-project score for females was 92.41 while that of male was 87.58 with no significant difference between them (P≤0.05). However, there was a significant difference between the genders in the pre-project test (P≤0.05). Females were found to be more sensitive to issues regarding climate change. The males on the other hand were found to be using mobile technologies more than females. This is in line with the findings of Rees and Noyes (2007) on gender difference in mobile phone usage.

Table 2: PRE –POST -PROJECT GENDER SCORES ON UML

Gender	Total	Pre-project		Post-project	
		Mean	Standard Deviation	Mean	Standard Deviation
Male	40	54.18	16.33	87.58	7.22
Female	40	40.10	14.72	92.41	9.16

Ho2: There is no significant difference between male and female participants in their awareness of usefulness of mobile phone learning in creating climate change awareness.

Mobile phone learning and climate change awareness

The means and standard deviations of the UML items at initial and final administration are displayed in Table 3. Prior to the project, the participants did not relate climate change to mobile phone usage. However, means of ≥4 were visible in items 6, 8 and 9 during the post-project survey. The end result was the more of awareness of climate change was created with the aid of m-learning technologies.

 Item 6; "E-learning climate change is more meaningful with UML" had a higher post-project mean of 4.50). There was a significant difference between the pre- and post-project means of this item thus; the use of mobile phones to create climate change awareness was highly appreciated. Item 8; "Analyzing climate change issues with UML is best done at one's free time; a form of recreation" had a higher post-project mean of 4.14. Item 9; "UML is significantly important for climate change awareness enlightenment" also had a higher post-project mean of 4.15 compared with the pre-project mean of 1.36. This is an indication of the participants' change of attitude having acquired the knowledge of the concept of climate change, its outcomes and probably solutions to its adverse effects.

The participants expressed their gratitude to the researchers at the end of the project having acquired the desired knowledge.

Table 3: Descriptive Statistics for UML items

S/N	Items	Pre-project		Post-project		Mean difference
		M	SD	M	SD	
1	UML is a very good learning instrument for learners in respect to climate change.	1.42	0.76	3.60	0.64	2.18
2	Climate change clues sent by UML through message are learners' friendly.	1.67	1.18	3.32	0.08	1.65
3	UML is a very good medium for providing useful information concerning climate change.	2.02	1.30	3.72	0.95	1.70
4	UML gives immediate access to climate change issues your location notwithstanding.	2.09	0.90	3,81	0.76	1.72
5	Climate change related discussions can conveniently be made via UML anywhere and at any time.	1.89	1.24	3.15	1.05	1.26
6	E-learning climate change is more meaningful with UML.	1.64	0.88	4.50	0.70	2.86
7	Analyzing climate change issues with UML create room for a better understanding.	2.10	0.98	3.81	0.85	1.71
8	Analyzing climate change issues with UML is best done at one's free time; a form of recreation.	1.65	1.08	4.14	0.86	2.50
9	UML is significantly important for climate change awareness enlightenment.	1.36	1.28	4.15	1.06	2.79
10	UML is a good medium for discussions on impacts of climate change	1.75	1.02	3.70	0.86	1.95
11	Creating climate change awareness using UML is quite easy.	1.88	1.24	3.92	0.98	2.04
12	UML made it easier to understand climate change.	2.28	1.16	3.68	0.07	1.40
13	UML can be used for interaction.	2.15	1.37	3.61	1.00	1.46
14	With the aid of UML, discussion of climate change issues with colleagues is simplified.	2.44	0.94	3.86	0.78	1.42
15	With the aid of UML, discussion of climate change issues with the researchers is simplified.	2.58	1.28	3.87	1.03	1.29
16	Information about climate change is best accessed on UML platform.	1.46	0.98	3.58	0.92	2.12
17	The use of UML in creating climate change awareness is generally encouraging and satisfactory.	1.58	1.02	3.78	0.88	2.20

Conclusion

In this project, mobile phone enhanced an increased understanding of mobile learning and climate change awareness. The project created a forum for direct observation of some adverse effect of climate change and the participants' reactions on them, thus their awareness of climate change. Males and females of different age brackets participated in the project and all expressed satisfaction with the technology.

Recommendations
Recommendations made are as follows:
I. Enlightenment programs should be organizes on the use of mobile phone for creating change awareness.
ii. More m-learning activities should be organized for the participants for further acquisition of skills.
iii. Mobile phones providers and other stakeholders should encourage such educational projects by sponsoring researchers in those areas.

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