

Disposition of Mobile Phones among University Students in Nigeria

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Abstract: A number of studies on Mobile Phone in Nigeria focused on its usage to alleviate some of the problems in the country. Mobile phones have become an essential personal belonging among the Nigerian students. There is a need to look into possible problems created by the advent of this ICT tool after a decade of its introduction. This study examined at behavioral tendency of mobile phone usage among University students in Nigeria from Social Computing perspective. A survey-based study was carried out among 2000 students of Obafemi Awolowo University (OAU) in Nigeria. The study confirmed that Nigerian students also associate some health risks to mobile phone usage. SAR value of a generic phone was simulated using the SEMCAD X V14.8 software used over a Phantom human head in a 6 minutes continuous call. The result of the simulation showed that for a 10g tissue the Max. SAR value is 1.74W/Kg which is still within the allowable limit of 2.0W/Kg specified for 10g tissue. Hence the study has further confirmed that no health hazard has been found with the use of mobile phones. The study suggested that the infiltration of mobile phones has altered the academic and personal life style of the students which may in turn have adverse effect on their academic performance. Further study is needed to establish the extent of damage to the academic performance of the Nigerian students. Further research is also needed to determine the effect of proliferation of foreign-used phones as well as supposedly new but not world standard phones on Nigerian Environment.

Keywords: SAR; Social Computing; behavioural tendency; health hazard

I. INTRODUCTION

Mobile phone is becoming ubiquitous among University students in Nigeria, as every student selected at random has a mobile phone. Mobile phone comes in different brands and prices from the simple and affordable ones to the sophisticated and expensive models. Mobile phones of today operate mostly in the radiowave and microwave frequency regions. As mobile phones become more sophisticated, the operation is at frequencies closer to ionizing regions rather than non-ionizing regions [1]. Public discussion on possible health risks from electromagnetic fields even below the legal thresholds is common [2]. Hence, the questions on how safe mobile phones can be will continue to be relevant. Health disorders that can result well in the ionizing regions like cancerous growths have mostly been expected after long time phone use, but such health disorders have not been reported in the literature [3]. Non-ionizing frequency regions do not destroy tissue molecules like ionizing frequencies do, since electromagnetic wave is absorbed, refracted and diffracted. However, the physical modification of matter after interaction can have a biological effect. Thus, the microwave heating of tissue can

cause damage to the tissue if the temperature elevation is too intense or prolonged exposure [4].

Our study focuses on the possible health hazards and behavioral tendency that can results from the interaction of man with mobile phones among OAU students. The study could be useful to forecast impending implications of mobile phone usage and also assist in shaping policies and guidelines.

II. RELATED WORK

Modern communications have instituted mobile phones. It was predicted in the year 2000 that by 2005, there will be as much as about 1.6 billion mobile phone subscribers worldwide [5]. Within the Africa region, ICT development and uptake are proceeding apace, with cellular mobile penetration at 52 per cent as at early 2012 [6]. GSM was heralded into Nigeria in 2001 and by 2007 has over 32 million subscribers which represent 23% of the population [7]. According to the NCC as at the end of 2012, mobile phone subscribers were over 113 million which is 60.01% of the population. According to the ITU, Nigeria's telecommunication industry is the largest in Africa, hence is it not out of place to look into the effect of this new

technology among the University students in Nigeria after a decade of its existence. This increase in mobile phone popularity has also opened up new areas of study, especially the effect of the mobile phone on its users. Public discussion on the possible health risks from electromagnetic fields even below the legal thresholds is common [2]. Mobile phones do not only radiate during use but also send brief location updates, four or more times an hour, to surrounding mobile base stations when not in use. [8] suggested there is the need for further work to determine the range of effects, the mechanism and the possible implications for safety limits of Radio Frequency Radiation as mobile phones emit radio waves, usually in the frequency range 100–2000 MHz. According to [9], in Sweden, handheld phones became common in the 80's, the risk of Acoustic Neuroma through the Mobile Phone usage among Swedish citizens was examined. The findings did not indicate an increased risk of acoustic neuroma related to short-term mobile phone use after a short latency period. However, the study suggested an increased risk of acoustic neuroma associated with mobile phone use of at least 10 years' duration. In 1995, there was an increased complaint about some health issues in Sweden and Norway. [10] then proposed a hypothesis that more GSM users in Sweden and Norway experienced symptoms such as headaches, feelings of discomfort, warmth around the ear and lack of concentration when using mobile phones. However, their study disapproved the hypothesis. In 2001, [11] examined the effect on human attention of exposure to the electromagnetic field emitted by mobile phones among Hong Kong teenagers. The results suggested that exposure to the electromagnetic field emitted by mobile phones may have a mild facilitating effect on attention functions. [12] further suggested that attention functions may be differentially enhanced after exposing to the electromagnetic field emitted by mobile phones. However, this concern about the habitual use of mobile phones and risk of brain tumors, present for many years, is yet to be validated [13]. [14] and [15] suggested that part of the electromagnetic field is absorbed by the user's brain and so could affect brain function. A recent report from the National Academy of Sciences recommends that this issue be further studied, especially in light of increasing use of mobile phones by children [16].

Despite this age-long active research in the health sector, Mobile phone is a technology developed in non-health-related domains [17]. A number of publications on Mobile Phone in Nigeria have been in the area of its applications to alleviate some of the problems in the country. There are also few about the management of waste generated using mobile phones.

Specific Absorption Rate (SAR) is a measure of the energy absorbed per unit mass of exposed tissue in a given time during the use of mobile phone expressed in W/Kg [18]. In Europe and US safety guidelines and recommendations have been set for all phones to be met

before being sold. Finding SAR values is not easy and even impossible especially for phones manufactured before 1998. For countries with no national regulations phone manufactures are expected to provide SAR values of the phones.

SAR values of standard phones were measured by scanning a phantom head with a Robot while assuming that the phone is operating at the highest frequency. The results are used to determine the maximum SAR values for the particular phone which are the published SAR values [19]. Our study found out that used phones and new phones specifically made for Nigerians are common with Nigerian students and the SAR values of these phones are not among the published ones. This study attempts to find SAR value of phone and this was compared with the published values. The study also considered mobile phone usage issue from the perspective of Social Computing. According to [20], Social Computing is computational facilitation of social studies and human social dynamics as well as the design and use of ICT technologies that consider social context. Social computing is a cross-disciplinary research with a number of application fields amongst which is to forecast the effects of changing technologies and policies on social and cultural behavior. This study intended to look into the effect of mobile phone on Nigerian University students.

III. METHODOLOGY

Two methods were employed in carrying out the study; experimental simulation and survey.

A. Experimental Set up

An Experiment was set up using SEMCAD X V14.8 software to simulate a generic phone being used over a Phantom human head in a 6 minutes continuous call. The setup is as shown in Figure 1.

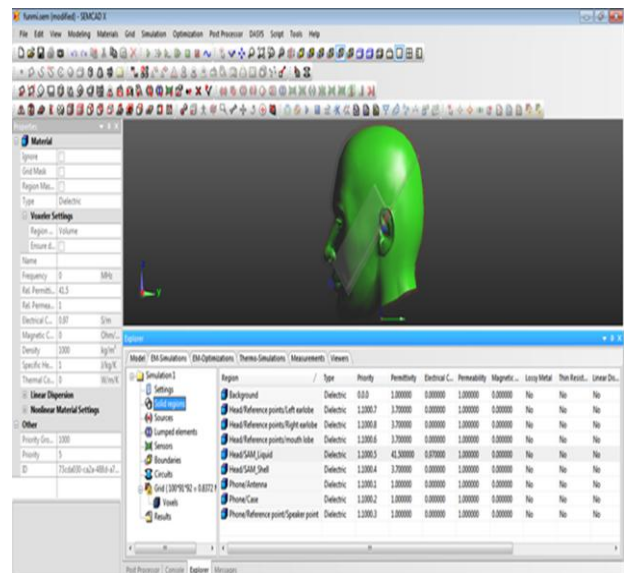


Figure 1. Experimental Simulation of SAR

B. Survey

1) *Demographic Information:* The survey was carried out in Obafemi Awolowo University (OAU), Ile-Ife, Osun State, Nigeria. OAU lies within latitude 7.5° N and longitude 4.53° W. The University belongs to the first generation of Universities in Nigeria with a student population of about 35,000 and spans about 13,000 hectares of land. All the faculties within the campus were sampled. 2,000 questionnaires were produced; response data from 1,895 healthy student populations was collected. This constituted about 5-percent representation of the total population. The respondents were between age range of 15 and 30. Survey equipment used was basically well structured survey questionnaires which comprise of 40 questions. The design of questionnaire information was exploratory and quantitative. The questionnaires were validated using experts.

2) *Test Condition and Information:* Though the questionnaires were distributed at random, few students confessed that they do not own a mobile phone so the questionnaire was retrieved from them, but all the respondents possess at least a mobile phone. The information in the questionnaire was limited to basic daily routine outlook and health issues.

3) *Preparation and Data Collection:* The survey questions were borne out of varying hypotheses from literature and so these hypotheses were being tested on respondents with uniquely identifiable nature compared with those in literature. The questionnaires were distributed to respondents to complete and it took an average of 10-20 minutes to complete. They were eventually collected and inspected to have been adequately completed for sample analysis, making sure the error evaluations were minimized.

4) *Data Analysis:* The questionnaires were analyzed using the Statistical Package for Social Sciences (SPSS) application software tool. Data was analyzed by using descriptive statistics. The open-ended questions were analyzed through quantitative content analysis with the aim of quantifying emerging characteristics and concepts [21]. Frequency tables were drawn and from these the data was presented. Other tables involving cross relationships were also drawn.

IV. RESULTS

A. Result of the Experiment

The result of the simulation showed that for a 10g tissue, the Max. SAR value was 1.74W/Kg. This was compared to the published SAR value for phones. Though the figure is high as the maximum published value is 1.59W/Kg but it is still within the allowable limit of 2.0W/Kg specified for 10g tissue [19].

B. Result of Survey Analysis

1) *Mobile Phone Use:* 80% of the respondents with sophisticated phones bought them as refurbished phones due to the cheap price. 40% of new phones are specifically made for Nigerian market. 60 % of the respondents who have a relatively high 'maximum call time per day' of continuous 5 minutes and above were basically within the age range 20-29 years using free night call offers. The analysis shows 63.7% basically do more of calling, 77.5% on other online activities like gaming, browsing, ping, chatting, etc. While 80.1% majority of respondents, usually place Mobile phones close to the ears, 12.5% usually uses hands-free, 6.5% on speakerphones and 0.9% do not have a specific routine. 42.5% of the respondents make use of Bluetooth devices for various mobile phone activities, against the 57.5% that do not make use of the device. It is of interest to note that a non-significant of the student's populace 0.02%, do not own a mobile phone while 40.2% have more than a mobile phone.

2) *Knowledge of Effects or Hazards of Mobile Phones:* The study showed that 17% of respondents have heard about SAR while 83% have not heard about it at all. 100% of the respondents do not know the SAR values of their phone. 96% of the respondents admitted that prolong calls can lead to possible heat generation, while 89% of them believe that placing Mobile phones close to the body can will eventually lead to significant radiation exposure, thereby causing harm to the body. A significant 76.5 % and 75.5% of the male and female respondents respectively agree that placing mobile phones this way may even lead to cancer. A significant 45.7% agreement of Bluetooth users with respondents conceives that Bluetooth devices could in a way lead to more harm in the body, while majority of Bluetooth device user gave a 54.2% disagreement on the notion.

Based on social, emotional and academic life, 94.9% of the students admitted that improved social, emotional and academic life of students can be attributed to mobile phone use. 94.2% of the 75.7% on free night calls admitted that mobile phones has altered their sleeping lifestyle and also has negative effect on their productivity during the day. 73.6% of the second hand phone users do not give a thought to life span of their phones. Hence do not care about the waste generated by these foreign used phones. 94% of those who use phones during lectures admitted that it's a form of distraction. 86.6% of the respondents agree to the fact that use of mobile phone while driving may result in road traffic accidents, while 20.5% of this admitted being a witness to such accidents.

V. DISCUSSION

Students in tertiary institutions are categorised as elites hence if they are ignorant about the SAR values then the result from the larger Nigerian population could be extrapolated. Though, the study established that most

phones in Nigeria are made for Nigerians hence the SAR values are not published in the known SAR documents, attempts could be made to simulate the SAR values in order to confirm their safety.

The consistent heat generated via signal reception posed a significant problem to the users. These effects were well attributed to prolong calls made via free call service provided to users especially during the night. Sleeping disorder which is as a result of addiction to free long night call is a major health problem. While users find it difficult to let go of free service plans, the service providers also find it difficult in reducing these free plans because of fear of losing customers. The proliferation of used mobile phones will also have an effect on the environment in the near future. The use of big lecture theatres because of the large student population gave the students the opportunity to use the phone for some other things while lecture is on-going. The lecturer does not really have class control.

VI. CONCLUSION

Our study confirms that Nigerian University students are also nurturing the fear that radiation from phone calls could lead to cancer, but the study has further confirmed that no health hazard has been found with the use of mobile phones. The alteration of sleeping disorder of students as a result of addiction to free long night calls may have adverse effect on productivity. The use of phones for texting, chatting watching football will also affect the performance of the students especially during learning periods. It is also seen that the cheap price of used phones make it attractive to Nigerian students hence may turn our environment to dumping site for used phones from foreign countries. Specifically, newly phones for Nigerian market that are not popular in other nations may need to be subjected to further tests. It is interesting to note that some University students (though few) in Nigeria do not possess a mobile phone which may be due to in affordability and the fact that it is not required for academic work, its purely a social tool.

Telecommunication industry may be advised to offer free night calls during weekend. Further study may be carried out to determine the academic performance of Nigerian University students since the introduction of mobile phones. The University authority may consider installing circuit breaking systems that will block all forms of GSM communications in its lecture theatre to dissuade students from using phones when lecture is going on. Also there is need to carry out further study on the proliferation of used phones in the country to avoid turning the country to a dumping site for foreign phones.

VII. REFERENCES

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