



Impact of perceived health hazards of smartphone usage on learners' productivity in technical and vocational education and training institutions in Lagos State

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Abstract

This study investigated the impact of perceived health hazards of smartphone usage on learners' productivity in technical and vocational education and training institutions in Lagos State. Descriptive research design was used for this study. the population for this work consists of all technical education students in tertiary institutions in lagos state. a sample of one hundred (100) students from three institutions namely Ogunsanya College of Education, Oto-Ijanikin, Federal College Of Education (Technical), Akoka and Yaba College of Technology all in Lagos State. A stratified sampling technique was used because the researcher was concerned primarily on sample from technical department and then a simple sampling technique was then employed to select samples across the stratified institution. A questionnaire tagged 'Impact of Perceived Health Hazards of Mobile Telephones Usage on Technical Students' was used to generate data for this study. Split half method of reliability was used to determine the reliability co-efficient value of 0.77. The use of student t-test (t-test), chi-square and multiple regression (r) statistical analysis was used to test the hypotheses at 0.05 level of significance. Findings from this study revealed that the use of cell phones is very good and has so many positivity attached to its usage, but beneath it lies hazardous impacts with respect to its usage. It was recommended that enlightenment programmes should be put in place to educate the students on the health hazards of the mobile telephone use. Also, enforcement of existing laws on defaulters who use this device while driving and in classroom while teaching and learning was also recommended.

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Introduction

Information and Communication Technology is referred to as the various set of technological/gadget resources used to communicate, and create, disseminate, store and manage information (Damasevicius, Misra, & Maskeliunas, 2018) ^[4]. The word ICT includes any communication device such as computers, mobile phones, radio, television, satellite system and so on (Jyanthi & Kumar, 2016) ^[12]. Mobile phone Technology as one of the components of ICT like globally, have also greatly affected the Nigerian educational system in recent times positively and otherwise. In recent times, smartphones are now in vogue. a multi-

purpose mobile computing devices which has multimedia functionality along with voice calls and text messaging (Sharma P., 2018) ^[20]. As per a study in 2014, 1.85 billion people were using smart phone among the worldwide population. This number is expected to be 2.32 billion users in 2017 and in 2020 it is expected to reach 2.87 billion.

Quality electronic learning resources in addition to being learner appropriate, aligned to state and local standards, and built around effective pedagogy and instructional design can provide many educational benefits, including; Engaging students through multi-media, interactive content, Strengthening understanding and thinking skills through exploration, collaboration and creation; Adapting to support differentiated or personalized learning for students who have a specific learning style, pace or needs; Keeping knowledge current and information accurate; Enhancing accessibility for physical or learning disabled students through assistive technologies and presentation of content in alternative modalities; and Integration testing and classroom management tools, thus allowing real-time tracking of student performance to inform instruction and provide accountability.

Technical and Vocational education and training deals majorly with the acquisition of knowledge and skills and the smartphones and other mobile technologies has been identified to help TVET learners in acquiring skills as reported by Emerson & Berge, (2018) ^[8] who opined that smartphone encourages micro-learning for the employed and unemployed for advancement of knowledge and skills.

On the contrary there are some challenges in the usage of smartphones experienced by the learners. One of these challenges is about the health hazards it poses to the learners and the impact on their academic performance. On 31st May 2011, the WHO confirmed that overuse of mobile phone indeed results in health risks and it classified cell phone radiation as a carcinogenic to humans (Acharya JP, Acharya I, & Waghrey D., 2013) ^[3] Micro wave or Electromagnetic radiations from the mobile phone alter the electrical activity of brain and it results in numerous health effects such as headache, difficulty in concentration, loss of mental attention, increased reaction time, sleep disturbances, fatigue, stress, hearing and concentration problems and also these radiations damage the areas of brain associated with learning, memory and movements Sarfaraz S, Bano T, & Fatima W, (2015) ^[19].

Though there are myriads of advantages of the usage of smart phones by our learners but it is necessary we let the learners become aware of the negative consequences its usage has on the learners and this triggered our zeal in this study to find the impact of perceived health hazards of smartphones usage on technical and vocational education and training learners' academic performance in tertiary institutions in Lagos State

Statement of Problem

Recently, there have been out-cry and fears expressed about the possible dangers that the use of mobile phones itself may harm users health, perhaps even causing cancer, miscarriages, birth defects, brain tumor, headache, fatigue, dizzy spells, memory loss and death during thunder storm. Since human activities began to add radiation to the environment, people have become concerned about the effects of it on health. Radiation may enter the body directly through the skin, but it is usually inhaled or ingested.

Prolonged exposure produces radiation sickness in some people which occur in stages.

The argument now beckons, what is the extent of this perceived health hazards on technical students? Gender differential have identified female students to be more IT friendly than male counterparts, the question before now beckons, who is more prone to health hazards between the gender? What precautions are put in place to manage the many challenges associated with the use of telephones? Any reductions in the use of the radio-active device in technical environment, to what extent can it impede performance? Hence, this study seeks to investigate, the Impact of Perceived Health Hazards of Mobile Phones Usage on TVET Students academic Performance.

Purpose of the Study

This study was designed to investigate the impact of perceived health hazards of smartphone usage on learners' productivity in technical and vocational education and training institutions in Lagos State.

Research Hypotheses

- H01:** There is no significant difference between the male and female students on the likely health hazards of telephone usage among technical studies students.
- H02:** There is no significant impact of radio-active agents on productivity level of technical studies students.
- H03:** There is no significant causative factor like cancer, miscarriages, birth defects, brain tumor, headache, fatigue, dizzy spells and memory loss and its negative impact on students' performance.

Significance of the Study

The result of the study will help researchers, lecturers, students to know the effects of these mobile phone usages on academic performance of students. The study will be of importance to teachers in that it will give them better information and more result oriented view point as to the likely hazards that are associated with the use of telephone usage. To students, the outcome of this will work will guide them in taking an informed decision as to the appropriate way to handle and use telephones because of the numerous health hazards identified while maximizing the device optimally. To researchers, the output of this will provide a port-folio with respect to an addition to the wealth of knowledge on IT related device usage and its possible impact on learners.

Literature Review

A mobile phone is a device that can basically make and receive calls over a radio link while moving around a wide geographic area. (Pew Research center, 2010). This is extremely similar to the fixed telephone in the early 20th century. The growth of mobile phone technology is demonstrated by the fact that in 2020, the usage of smartphones worldwide has risen tremendously to about 2.7 billion users (Sharma, 2013).

Apart from keeping contact with friends, family members, conducting business, smartphones are very useful in learning. According to Jung (2014) ^[13], smartphones provides ubiquitous learning (u-learning) combines the characteristics of electronic learning (e-learning) and mobile learning (m-learning), in driving forward different forms of learning through the internet connection process in the 21st century

hence the role of smartphone and mobile technologies in education must not be ignored (Tikoria & Agariya, 2017)^[21]. Despite the prevalence of this attitude, particularly among the various regulatory bodies both nationally and internationally, it is not one that is universally held and the debate over the potential noxiousness of GSM radiation continues at both professional and public levels. What is so disturbing is if the same level of concern and uncertainty was obtained in the case of a new food or drug, they would never be licensed.

Human cell studies have shown that students of all categories are not excluded from the relative hazards associated with the use of smartphones. The widespread use of hand held mobile phones means that many students routinely place radio frequency (RF) transmitter against their heads or hearts (breast pocket, majority of the population do so respectively in different climes and geographical location.

Akansha *et al.* in a study on the effects of excess usage of mobile phone on the mental health and quality of life of adolescents found out that the limited users of smart phones have better mental health and quality of life than the unlimited users

Methodology

This study used a descriptive survey research design because the design seeks to describe all variable relating to the study. The population for the study was all Tertiary Institution students in Lagos State. A sample of one hundred students was used for this study as three institutions of Adeniran Ogunsanya College of Education (AOCOED), Yaba Technology (Yaba Tech) and Federal College of Education (FCE, Akoka) Lagos. A sample of 100 students were used in the course of this study. A stratified sampling technique was

adopted whereby technical students from FCE, Akoka (40 respondents), Yaba Tech selected (40 respondents) and AOCOED selected (20 respondents) from each institution irrespective of their levels so long the students have access to a mobile phone. However, after the stratification, a simple random sampling method was then employed to select these students. AOCOED got the lowest because the department records one of the least in the college while in other sampled institutions the enrolment rate was on the high side. A questionnaire tagged with thirty items tagged "Impact of Perceived Health Hazards of Mobile Telephones Usage on Technical Students" were used to generate data for this study. After meeting face and content validity by experts in the field of Test, Measurement and Evaluation twenty students distinct from the sample of the study but have all the characteristics with some of the main study was used as pilot study. After data generation, split half method of reliability was used to determine the stability and consistency of items in the instrument as a reliability co-efficient value of 0.77 was derived for the questionnaire. Three statistical analysis were used to test the three formulated hypothesis in this study due to the variation in the sign post used in the course of formulating the hypothesis. A student t-test, chi-square and multiple regression statistical analysis were used to test the formulated hypothesis at 0.05 level of significance.

Results and Interpretations

Three Hypotheses guided the researchers and were analyzed as thus:-

Ho1: There is no significant difference between the male and female students perception on the likely health hazards of telephone usage among technical studies students.

Table 1: Student t-test analysis showing difference between male and female students' perception on the likely health hazards of telephone usage among technical studies students

Gender	N	Mean	SD	DF	t-cal	t.tab	P	Remark
Female	50	64.71	8.81	98	2.59	1.94	0.05	Significant
Male	50	83.79	9.85					

Source: Fieldwork, 2020

From the table above, it shows that 50 respondents were female with a mean value of 64.71 and standard deviation value of 8.81 while male respondents have a mean value of 83.79 and standard deviation value of 9.85 respectively. However, at 98 degree of freedom and 0.05 significant level, the t-calculated value was 2.59 while t-table value stood at 1.94 respectively. Since the t-cal. Value is greater than the t-

table value, the null hypothesis is rejected while the alternative hypothesis which states that there is a significant difference between female and male students' perception on the likely health hazards of telephone usage among technical studies students.

Ho2: There is no significant Impact of radio-active agents on productivity level of technical studies students.

Table 2: Chi-square analysis showing significant impact of radio-active agents on productivity level of technical studies students

Variables	SA	A	D	SD	Total	Mean	SD	DF	P	Chi-Square Cal.	Chi-Square Tab.	Decision
Radio-active agents	85	46	36	23	190	56.6	34.7	3	0.05	25.51	7.82	Significant
Productivity level	71	95	66	56	288	54.3	29.7					
Total	156	141	102	79	486							

Source: Fieldwork, 2020

From the chi-square table above, it shows that radioactive agents have a higher mean value of 56.6 and standard deviation value of 34.7 while Productivity level have a mean value of 54.3 and a low standard deviation of 29.7 respectively. At degree of freedom value of 3 and 0.05 level of significance, the chi-square cal. Value was 25.51 and chi-square table value of 7.82 respectively. Since the chi-square calculated value is greater than the chi-square table value, the

null hypothesis would be rejected as the alternative hypothesis which states that there would be significant impact of radio-active agents on productivity level of technical studies students.

Ho3: There is no significant negative impact of causative factor like cancer, miscarriages, birth defects, brain tumor, headache, fatigue, dizzy spells and memory loss on student's performance.

Table 3: Multiple Regression Analysis showing Significant Impact of Causative factor like Cancer, Miscarriages, Birth Defects, Brain Tunor, Headache, Fatigue, Dizzy Spells and Memory Loss on Students' Performance

Variables	No	Mean	SD	DF	P	r-Cal.	R.tab	Decision
Cancer	100	23.33	51.55	98	0.05	0.895	0.268	Significant
Miscarriages	100	25.53	43.13					
Birth defects	100	33.52	23.22					
Brain Tumor	100	36.32	46.34					
Headache	100	28.82	37.99					
Fatigue	100	74.36	28.84					
Dizzy Spells	100	22.99	14.43					
Memory Loss	100	54.73	32.56					
Academic Performance	100	79.45	43.2					

Source: Fieldwork, 2020

From the multiple regression table above, it shows the various resultant factors that are most likely to arise due to the incessant use of mobile phones. Cancer, miscarriage, continuous headache and dizzy spells have very low mean values 23.33, 25.53, 28.82 and 22.99 while academic performance have a very high mean value of 79.45 respectively at 98 degree of freedom and 0.05 level of significance, the regression cal. Value was 0.895 while the regression tab. Value stood at 0.268, and since the r-cal value is greater than r-tab. Value, the null hypothesis is rejected and the alternative hypothesis which states that there is a significant negative impact of causative factors like cancer, miscarriages, birth defects, brain tumor, headache, fatigue, dizzy spells and memory loss on students' performance.

Discussion of Findings

In hypothesis one which showed that there is a significant difference between female and male students' perception on the likely health hazards of telephone usage among technical students was in consonance with the assertion of Abati (2003) ^[2] and Fagbure (2004) ^[9] who opined that female students most especially are glued to the use of cell phones compared to their male counterparts. These views as put forward noted that because of the increase in the usage of cell phones by female students they are mostly prone to related health hazards usually associated with the usage of mobile apps. Gender plays a significant role here because female gender by nature have the love for aesthetics (beauty) and are more curious on innovative devices than their male counterparts who are more concerned with cognitive related tasks. Due to this flair for phone use by female learners their perception towards its usage differ because their perception rate as to the usage is usually down played and its hazards are not usually considered significantly.

Marc and Mark (2001) ^[16] maintained that in any given society, female learners are more attracted to the use of cell phones either to aid problem oriented task or for normal use. Females generally derive some forms of pleasure working with it, easily driven to sourcing information and above all show some form of class. Before now the use of phones was not within the reach of all, but now virtually every household use phones and the female gender are mostly glued to the use of these devices. Hence their perceptions towards the nature of hazards from phones usages are usually down played and have no significance to them. Unlike the male gender who is usually carried away with analytical and cognitive related tasks.

Adey and Byus (2000) ^[1] and EMF acts consultants (2004) alluded that radio-active agents have a significant impact on productivity level of end-users. No doubt because students

are die hard users of these devices, the tendency for these radio active agents to affect their performance in school task is very high. The components of these active agents comprises of various electro-magnetic devices that have tendency of secreting certain toxic chemicals gradually into the body system when exposed to heat, body temperature, and certain secretion from the body. The components of a mobile phone device is so deadly and cohesive to the body thereby causing a defect on the body system. However, continuous emissions of these toxic chemicals on end-users have the tendency of affecting their rate of productions. Students have always being advised to keep their cell phones distant from them because incessant contact with this device have a way of affecting their productivity rate in school related activity and other areas of lives.

Anxiety remains a psychological variable that affects phone usage indiscriminately. The radio-active agents responsible for functioning of this phones is attributed to increased heart beat in an attempt to make an important call that does not go through, loss of mobile phone can lead to rise in one's blood pressure, expectant and inability to call out can also cause anxiety too, Dahunsi (2012) ^[6].

Hypothesis three have it that there is a significant negative impact of causative factors like cancer, miscarriages, birth defects, brain tumor, headache, fatigue, dizzy spells and memory loss on students' performance. This is in conformity with the works of Whelan (2000) and IHEE (2001) ^[15] who maintained that incessant use of mobile phones can cause brain tumor, fatigue, miscarriages, brain loss, cancer among others. Due to the high electro-magnetic components that have adverse effect on users, indiscriminate exposure of this device to unregulated environment, body temperature and heat have the tendency of causing serious damage if not well handled carefully. This device is surrounded with acidic components and other chemical related solvents that aid connectivity. Scientifically, they also paralyze sensitive human parts that are exposed to the hardware device continuously over time.

Dahunsi (2012) ^[6] stressed that through the use of mobile phones, cancer of the skin can occur due to exposure of the skin to the radiation from the phone, heat emitting from the device can cause brain damage and memory loss. Most times too, accidents occur when these phones are used while driving, sudden reception of bad news near dangerous spots among others. Also, exposure of phones to naked light, near petrol stations among others.

Excessive use of mobile phones is known to be associated with head ache, ear ache, warmth sensations and also perceived concentration difficulties.

Conclusion

This paper concluded that the use of smartphones is very good and has so many positives attached to its usage, but beneath it lies hazardous underlay with respect to its usage. The component of this device is tied to certain radio-active agents which if not cautiously utilized would affect productivity level of learners, most especially among technical education students. It is important that students apply more caution in the use of their mobile phones as this would invariably prevent the cause of brain damage, memory loss, fatigue, skin related infections among others. Furthermore, students should reduce the length of time spent on receiving and making calls as this would reduce the amount of heat emitted from the mobile device and level of radiation from the mobiles as it would also aid its reduction as promptly.

Recommendation

After affirming the outcome of the work, the authors recommend the following:

1. Enlightenment programmes should be put in place to educate the students on the health hazards of the mobile telephone use, most especially the female learners because this would help them to understand the health implications associated with keeping this device very close to our bodies.
2. Enforcement of proper punishment on defaulters who use this device in the classroom while teaching and learning is going on.
3. There should be orientation programme for new learners (freshers) to educate them on proper and safer method of using smartphones.

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