

Screen Time, Health Implications and University Students' Awareness in Nigeria

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Abstract —

Our study examined Undergraduate students' awareness of the health implications associated with the use of screen devices. We sought to determine the extent to which university students in Southeast Nigeria expose themselves to electronic screen-based devices; the possible factors influencing the students' level of exposure to the devices; ascertain the possible health implications associated with the students' exposure to the devices; establish the undergraduate students' level of awareness of health implications associated with exposure to screen-based devices; and assess the students' views on ways the health implications could be curtailed. A mixed research approach was adopted for the study. Findings generally indicate that university students in Southeast Nigeria spend amazing amount of time on 'screen-based devices' (computers, phones, video games, television), which have become an essential part of their life. Also, these students have a high level of awareness of the possible health implications associated with the use of screen-based devices, as most of them claim to have experienced one form of health challenge or another in the course of using the devices. Therefore the study recommended that relevant government agencies and Non Governmental Organizations as well as the media should educate people in order to create awareness on certain precautionary measures users of screen-based devices need to take to reduce the health risks they may likely face in the cause of utilizing screen-based devices.

Keywords — *Screen time, screen-based devices, health implications, multi-tasking*

I. INTRODUCTION

We have observed that people continue to do things consciously and unconsciously without knowing the health implications of their engagements and actions. Cases abound on people's indulgence in risky behaviours, including unprotected sex, alcoholism and intake of hard drugs which seemingly give them joy and a feeling of some sort (being high, feeling on top of the world, easing off and forgetting worries).

Studies in the United States show that “approximately 67% of male and 56% of female undergraduate students reported that they typically consume alcohol at least two nights per week. These

rates are particularly alarming given that the legal drinking age is 21 years. Men claimed to consume alcohol significantly more frequently than women. Men were also seven times more likely than women to gamble online.”[1] Most of these actions have so much been imbibed by some people to the extent that they become not only habits but also addictions, as they give some degree of pleasure or satisfaction.[2]

Taking into account the above scenario, research has also shown that the emergence of the television and the modern screen-based technologies have brought many benefits to the users. Reference [3] argues that the “usage of phones and computers to access the internet and the social media have enhanced speed of communication and availability of information.” Reference [4] puts it succinctly, saying that today, rather than traveling far distances to transact business; sending of reports and news stories; editing and circulation of newspapers/magazines; delivering of documents etc are now sent on-line: and, it is relatively and extremely fast, cheaper, reliable and convenient.

Some scholars have noted that the new media have in no small measure, expanded the scope of social interactions, friendships and relationships among people; they make it easy to stay in touch with people.[5],[6],[7] One of the breakthroughs in information and communication technology in the 21st century was the discovery and emergence of the new media, which have facilitated the creation of the different platforms for social interaction. The potentials of the new media are seamless and boundless in terms of interactions, interrelationships, and information sharing and exchanges. [8] This is possible because the new media are internet propelled. The use of screen and internet based technology, specifically, by college students has been associated with more frequent communication. [9] The internet facilitates communication and helps students maintain close ties between family and friends, especially those too far away to visit in person on a regular basis. [10][11] Also, college students can build social networks through internet communication by extending relationships with family and friends. [12]

Also, people use the new media and the screen devices for academic purpose, which was the reason the facebook was introduced.

Aside the many benefits of ubiquitous screen-based devices and technologies, the problem of over use, compulsive use; pathological use, over exposure, abuse or addiction to them is becoming increasingly apparent. [13] The interactive characteristics of the new media technology – smart phones in particular – contain inducing and reinforcing features that promote excessive usage behaviours. [14][15] College students represent a particularly vulnerable group for problems associated with new media use, because research in Nigeria and elsewhere has indicated that each of them has at least a mobile phone, many of them own desktop or laptop computers while others who do not have personal computers access them in their hostels, libraries and computer labs or patronize cyber cafes. [16] Apart from the traditional television, the ever-expanding repertoire of new screen activities including video and computer games, computer use and hand-held devices introduced over the last couple of decades is contributing to total screen use. [17] Trend data suggest that screen use is increasing; in the five years leading up to 2009, young people in the US increased the time they spent using screens from a daily average of 5 hours to 7.5 hours. [18]

Meanwhile, some studies reveal that there could exist some kinds of effects, based on the usage pattern for these technologies. [19][20][21][22] It is therefore, pertinent to examine potential health effects of this exposure. Although previous studies on the negative impact of new media and screen based devices carried out among some students in the United States seem to indicate their awareness of such negative impact, the percentage of the awareness was very low and the studies were not specifically on the health impact. [23][24] There is then, the need to ascertain users' awareness of the health implications associated with the regularity of exposure to screen-based devices.

II. PURPOSE OF STUDY

In view of the foregoing, our study sought to explore university students' awareness of the possible health implications inherent in regular exposure to screen-based devices. We specifically sought answers to the following questions:

1. To what extent are university students in Southeast Nigeria exposed to electronic screen-based devices?
2. What possible factors influence these students' level of exposure to the devices?
3. To what extent are these students aware of the health implications associated with exposure to screen-based devices?
4. What are their views on ways such health implications could be tackled?

III.A REVIEW OF EMPIRICAL STUDIES ON THE SCREEN AND HEALTH

The health implications associated with screen exposure are multifarious as espoused by many scholars. However, some of them (health implications) are controversial as there have been arguments for and against them, following varied research outcome. Some of the scholarly works related to this research are highlighted, with the issue of electromagnetic field/radio frequency emission from the screen-based devices and its attendant health consequences as most controversial.

As phones connect us to the Internet, it is assumed that they use more power and give out more radiation. Exposure to electromagnetic fields emitted by mobile phones has a mild debilitating effect on human attention. [25]

Similarly, there is a considerable level of health risk associated with using a smart phone in a closed space, including charging the phone in the bedroom. [26]

In a study conducted by the Japanese National Institution of Information and Communication Technology, findings suggest that most of the radio frequency energy from smart phones used in metallic enclosed environments, such as elevators, trains and airplanes, remains inside these structures because of lack of vent; possibly resulting in field levels exceeding the international safety guidelines. [27]

Also, a research group in Sweden, led by Dr. Lennart Hardell, and which published its work in January, 2013, discovered that there is a consistent pattern of increased risk for glioma and acoustic neuroma associated with use of wireless phones (mobile phones and cordless phones) mainly based on results from case-control studies from the Hardell group and Interphone final study results. The authors conclude that the existing radiofrequency exposure standards are "not adequate to protect public health." [28]

This finding was reinforced by the Bioinitiative Working Group, involving 29 independent scientists and health experts from 10 countries, who after reviewing over 1800 new scientific studies (from 2006 to 2011) conclude in part that there is a consistent pattern of increased risk for glioma (a malignant brain tumour) and acoustic neuroma with the use of both cell phones and cordless phones.

In a related research, the National Institutes of Health–American Association of Retired Persons Diet and Health Study cohort has given important insights into the link between screen time and cancer. It consisted of a prospective cohort study of 488,720

men and women aged 50 to 71 years at baseline from 1995 to 1996. It found out that High levels of TV and (or) video watching were associated with an increased risk of colon cancer for men and women and endometrial cancer in women.

Conversely, in its review of hundreds of scientific studies (re-tested research), the Independent Advisory Group on Non- ionizing Radiation holds that no research has suggested that exposure to RF fields was genotoxic (relating to the degree to which something causes damage to or mutation of the DNA) or increased the risk of cancer; and that several large, well-performed animal carcinogenicity (the state of causing or tending to cause cancer) studies had reported that exposure to mobile phone or other signals was without significant effect on longevity and survival, or on the incidence of spontaneous or induced tumours.

The Independent Advisory Group on Non-ionizing Radiation, in addition to saying that there had not been any convincing evidence that RF fields caused genetic damage or increased the likelihood of cells being malignant, posited that well-performed large-scale studies had found no consistent evidence of RF fields affect on the brain, nervous system or the blood-brain barrier, on auditory function, or on fertility and reproduction.

Though the group, Independent Advisory Group on Non- ionizing Radiation, admitted of existence of some evidence that RF field exposure might affect EGG and other markers of brain function, it notes that those effects have not been consistent across studies. In addition, it argues that the size of the reported effects is often small relative to normal physiological changes, and that it is unclear whether such effects have any implications for health. The study by the group further suggests that the accumulating evidence on cancer risks, notably in relation to mobile phone use and Wi-Fi applications, is not definitive, but overall is increasingly in the direction of no material effect of exposure. This is because the evidence considered overall has not demonstrated any adverse health effects of RF field exposure below internationally accepted guideline. [29] In the same direction, the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) holds that there is no clear evidence in existing scientific literature that the use of mobile telephones poses a long-term public health hazard (although the possibility of a small risk cannot be ruled out).

Further studies have examined the different health effects of computer use on adults such as symptoms in the upper extremities, headache, and eyestrain.

A study on computer use among students from 38 schools in Sweden in 2005, involving 1,575 females and 1251 males, showed that most computer use (about 90%) took place outside school (mainly for entertainment). Headache was reported by 51% and 24%, and neck or shoulder symptoms by 31% and 15%, of the females and males, respectively. More than 50% of the females with health complaints indicated that their problems had disturbed their sleep. For those using computers more than 56 hours per week, the prevalence ratios were significantly increased for neck or shoulder symptoms among both the females and the males, and for eyestrain and forearm symptoms among the females. [30]

Reinforcing the foregoing study, a survey carried out at Harvard University revealed that among 1,544 graduating seniors, over half experienced symptoms with computer use. Of all the participants, 60% (122/206) reported persistent or recurrent upper extremity or neck pain. This would suggest that the extent to which this is a problem among students is likely related to hours of computer use.[31]

Also, the prevalence of pain was similar to studies of computer users in the workplace. Some studies hold that 62% of computer users in workplace settings, reported neck/shoulder discomfort and a 30% prevalence of hand/arm discomfort. They also reported pain prevalence rates of 17% for the shoulder and 22% for the hand/wrist. [32][33]

In the same vein, a study of New York adolescents postulated that adolescents who watched three or more hours of television daily were at a significantly elevated risk of frequent sleep problems by early adulthood. [34]

Another study which explored the association between television viewing and sleep disturbance in just over a thousand children aged between four and ten found that television-viewing habits including amount of television viewed daily, the presence of a television in the child's bedroom and the bedtime television viewing were associated with the greatest number of sleep disturbances. This study also found increased amounts of television viewing were associated most significantly with difficulty getting to and staying asleep. [35]

This is in line with a similar study which asserts that as the television is now online, researchers in the United States have shown that college students who consider themselves addicted watch twice as much as other students: 21 hours a week instead of 10 hours. [36] Also the expanding screen-use culture of the youth is a source of concern, as research indicates that excessive screen time is associated with health and wellbeing adversity for

young people, especially about their mental and physical health. Mobile phones have been shown to be the likely cause of headache, extreme irritation, increased carelessness, forgetfulness, poorer reflexes and a clicking sound in the ears. [37]

Another study in India found that nearly one fifth of youth aged 16 to 18 were “Internet dependent” and that teenagers skipped sleep to go online and feared that life without the Internet would be dull. The impact of this on the mental health of ‘Internet dependents’ needs to be stressed as they experience more loneliness, depression and depressive symptoms than those who used the Internet moderately. [38]

Findings from a study titled “Writing on ICT use and mental health in young adults,” suggest that intensive ICT use could have an impact on mental health in young adults. Frequent mobile phone use was a prospective risk factor for reporting sleep disturbances in the men that were studied, and symptoms of depression in both sexes. Intensive computer use (“intensive” in terms of duration of use or continuous use without breaks) was a prospective risk factor for reporting sleep disturbances in the men and stress, sleep disturbances, and symptoms of depression in the women. Combined intensive computer and mobile phone use enhanced associations with mental health symptoms. [39]

Similarly, a study of Computer vision syndrome and associated factors among medical and engineering students in Chennai, India, found t significant correlation between increased hours of computer use and the symptoms of redness, burning sensation, blurred vision and dry eyes. A similar study conducted among 416 medical and engineering college students had a total of 334 students report a history of one or more of the symptoms of CVS. Hence, the prevalence of CVS in the study population was found to be 80.3% (more than three fourth of the students). According to the study, the students were also developing headache, neck and shoulder pains. [40]

A study of Computer Use and Vision Related Problems among University Students in Ajman, United Arab Emirate found that there was increased incidence of when a computer screen was viewed at a distance of less than 50 cm. This was in line with some other studies that highlighted the fact that with shorter distance the visual fatigue increases especially in individuals with a disparity between the (shorter) viewing distance and the individual’s (longer) dark convergence. Nearly, more than half of the students included in the study had mentioned some computer-related eye problems. Headache, burning sensation in eyes and dry/tires/sore eyes were the most common visual related problems associated with usage of computers. Female preponderance was

observed for developing the problems. Improper viewing distances from computer screen; filters not being placed on the screens and using computer without taking frequent breaks were found to significantly contribute to these symptoms. [41]

A review of 30 studies (26 of them experiments; 4 longitudinal studies) on the health effects of video and computer gaming showed there was no statistically significant link between overweight and video or computer gaming. [42]

IV. METHODOLOGY

We adopted a mixed method approach, involving quantitative and qualitative designs, for our study. These are survey and Focus Group Discussion. The research methods were selected to complement each other.

For the survey approach, the study population comprised all university undergraduate students in three randomly selected South East States of Anambra, Enugu and Ebonyi, in Nigeria.

Table 1 : Sample Of Selected Universities And The Population Distribution

S/N	State	University	Population
1	Anambra	Nnamdi Azikiwe University, Awka	37,182
2	Enugu	Godfrey Okoye University Ugwuomu-Nike	1,200
3	Ebonyi	Ebonyi State University, Abakaliki	27,558
		Total	N=65,940

Source: Universities’ Students’ Affairs Units

From this population we drew a sample size of 398 using the Taro Yamane formula: $n = \frac{N}{1 + N(e)^2}$. Next we used multi-stage probability sampling technique in selecting the universities from the randomly selected states; the faculties; the departments and the study levels. Accordingly, Nnamdi Azikiwe University, Awka, Godfrey Okoye University, Enugu and Ebonyi State University, Abakaliki were selected to represent Anambra, Enugu and Ebonyi state respectively.

At the Nnamdi Azikiwe University, Awka, two faculties were randomly selected: Social Sciences and Engineering. For the purpose of representativeness, two departments were chosen to represent each of the faculties selected. This process was repeated in Godfrey Okoye University and Ebonyi State University with four (4) and eleven faculties respectively. To further delimit the sample for effective administration of data collection instrument, we used mathematical proportionality to rationalize the distribution of questionnaire to schools according to the numerical strength of the schools.

Hence nine respondents each were selected from the selected departments across the levels in Nnamdi Azikiwe University, Awka (which has the highest population among the selected universities), making a total of one hundred and forty two respondents (142). Eight (8) respondents were drawn across the levels in the selected departments in Ebonyi State University making a Total of one hundred and forty four (144), while seven (7) respondents were issued with questionnaire across the levels in the selected departments in Godfrey Okoye University, Enugu, making a total of one hundred and twelve (112).

The instrument used for the survey data collection was a 26-item, pre-validated, questionnaire. The items in the questionnaire addressed the variables related to the research questions developed for this study and were structured in a close-ended form. The questionnaire was divided into six sections. The first section sought the respondents' demographic data, which included: age, sex, field of study and year of study. The second section was made up of questions that sought to establish the respondents' exposure to screen-based devices. The third section consisted of questions that tended towards identifying factors influencing the respondents' frequent use of screen devices. The fourth section made up of 3 questions, sought to ascertain the respondents' knowledge of the possible health implications associated with exposure to the devices. The fifth section consisted of 4 questions which examined the level of awareness of the respondents on the health implications associated with exposure to screen-based devices.

Then, for the focus group approach, the digital recorder was used to capture the narratives and experiences of the participants. This was further transcribed and thematically analysed in order to address our research questions.

The questionnaire items, alongside the focus group, were grouped into different sections, based on the research questions. All the questions were close-ended and pre-coded. The main independent variables were the typical basic socio-demographic variables such as age, sex, institutional affiliation, field and level of study. The major dependent variables, included:

- Accessibility and exposure to screen-based devices
- Factors influencing students' exposure to screen devices
- Level of students' awareness of the health implications
- Ways of curtailing the health implications.

Accessibility and exposure to the screen-based devices ... were measured using question-items that addressed the respondents' accessibility, ownership,

exposure and frequency of using digital screen devices.

Factors influencing students' exposure to the screen devices ... were measured by question-items that sought to identify the reasons the respondents made use of screen devices (entertainment, affective needs [chatting], belongingness and relaxation.

Students' level of awareness of the health implications ... was measured, by asking the respondents some questions on their awareness of the health risks associated with the use of screen devices.

Ways of curtailing the health implications ... were measured by asking respondents for suggestions.

For the Focus Group Discussion, a set of focus group interviews was carried out, drawing students from Nnamdi Azikiwe University, Awka; Godfrey Okoye University, Uguommu-Nike Enugu and Ebonyi State University, Abakaliki. The participants were gathered through the snowball technique where one contact generated further contacts. Given that only a few numbers of participants are required, six (6) students were selected from each of the universities, for the three sessions of discussions conducted in the three states, making a total of eighteen (18) students for the whole discussions.

V. DATA PRESENTATION AND ANALYSES

The respondents' demographic variables were measured using items 1-5 in the questionnaire. Over half of the respondents are males, represented by 55%, while 45% are females; 31% of the majority of the respondents are between the age brackets of 21-25; those within the age bracket of 15-20 are represented by 27%; 23% of them are between 31 and above; while those between 25-30 is 19%. This finding is indicative of the school age of most Nigerian undergraduate students as the majority are between 15-25 years. The majority of the students that participated in this study are in the social sciences, given at 30%; this is followed by Arts and Humanities at 23%. 19% of the respondents are in the field of sciences; 16% represents those in the field of Management Sciences while Education had the least at 12%. First Year students were in the majority at 41%, followed by second year students at 32%; those in fourth year and above had 13% while third year students' participation is 12%.

A. Respondents' Access to and Ownership of Screen-Based Technological Devices

This section presents respondents’ access to and ownership of screen-based devices. Their level of exposure to same was also sought.

All the respondents claimed to have access to screen-based devices, with only 0% giving a negative response. This indicates a very high prevalence and accessibility of screen-based devices among the undergraduate students which may invariably suggest the high level of usage and exposure to the possible health hazards associated with such exposure.

Table 2 : Devices Accessible To The Respondents

Electronic Screen Device	Respondents’ Ownership of Electronic Devices	Device Accessible to Respondents	Exposure to Preferred Electronic Device
Television	27%	28%	34%
Mobile Phone	49%	50%	40%
Computer/Laptops	22%	19%	22%
PSP Game Gadget	2%	3%	4%
Total	100% (n=396)	100% (n=396)	100% (n=396)

Having determined accessibility of screen-based devices among the students, we went further to find out which of the devices were more accessible to the students; which they mostly own; and which one they are more exposed to. Findings from the table above show that almost half of the respondents (49%) own mobile phone; 27% own a television; 22% own a computer/laptop while 2% own a PSP game gadget. Again, 50% of the respondents opined that the mobile phone was more accessible to them; 28% indicated having more access to television; those that have access to computer/laptop are 19% while PSP game gadget had about 3%. Meanwhile, 40% of the respondents were more exposed to mobile phones; 34% were more exposed to television; 22% were more exposed to computer/laptop, while 4% were more exposed to PSP game gadget. These findings indicate that these students are highly exposed to screen-based devices as majority of them not only have access to the devices but actually own the devices which may entail constant use.

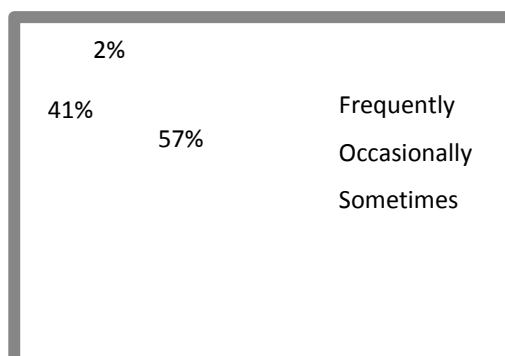


Figure 1: Respondents’ Frequency of Device Utilization

Data in figure 1 shows that more than half of the respondents represented (57%) make frequent use of screen devices; 41% utilize the devices occasionally while 2% sometimes make use of the devices. This finding coincides with the findings in Table 2, where majority of the respondents affirmed high exposure to screen devices due to their high level of accessibility to same.

Table 3 : Time Spent By Respondents Using Electronic Devices

Time Spent	Percentage
0-5 hours	49.7%
6-10 hours	23%
10 hours and above	28%
Total	100% (n=396)

Data in Table 3 shows that 49% of the respondents spent 0-5hours using the electronic devices; 23.% spent 6-10hours; while 28.% spent 10 hours and above. This suggests that majority of the undergraduate students spent huge amount of time engaging their electronic devices and this, also, invariably suggests the high tendency of being exposed to the health hazards associated the use of screen-based electronic devices.

B. Data Presentation on the Factors that Influence the Respondents’ Pattern of use of Screen-Based Devices

Table 4 : Whether There are Factors Influencing Respondents’ Usage of Screen Based Devices

	Percentage
Yes	100%
No	0%
Total	100% (n=396)

Data in the above table presents that the entire students admitted that there were factors influencing their usage of screen-based technologies. This might stem from the fact that there are various

individual needs and appeals that lure them into using the various technologies.

Table 5 : Needs Respondents Satisfy Engaging with Their Devices

	Entertainment Need	Affective Needs	Relaxation Need	Need for Belongingness
Yes	100%	100%	100%	100%
No	0%	0%	0%	0%
Total	100% (396)	100% (396)	100% (396)	100% (396)

Having established that the students satisfy basic needs using the devices, Table 4 reveals that the respondents wholly utilize screen-based technologies to satisfy their entertainment needs, affective needs, 'relaxation' as well as 'belongingness'. This conforms with data in Table 3 where respondents admit to spending greater amount of time utilizing the technologies.

C. Presentation of the Respondents' Awareness of and Experiences of the Health Hazards Associated with the use of Screen Based Devices

Table 6 : Respondents' Awareness of and Experience of Health Challenges Associated with Using Screen-Based Technologies

	Awareness of Health Implications	Experienced the Health Challenge
Yes	100%	99%
No	0%	1%
Total	100% (396)	100% (396)

Given the need to determine the respondents' awareness of and experience of the health hazards associated with the use of screen devices, data in Table 6 shows that all the students are aware of the health implications associated with use of the technologies while nearly all of them (99%) experience the health challenge. This possibly attests to a high level effect of the technologies on the users.

Table 7 : Health Challenges Experienced by the Respondents as a Result Of Exposure To Device

Sight Challenge	53%
Ergonomic Problems	5%
Body Pains	42%
Cancer	0%
Total	100% (396)

Data in Table 7 further shows the peculiar health challenges being experienced by the respondents as a result of their exposure to screen devices. About 53% of the students experienced sight challenge; 5% of them experienced ergonomic

problems; 42% experienced body pains while none of them claim to have developed cancer. This illustrates that majority of the students are challenged by sight problems owing to their exposure to the technologies and refutes the argument by some scholars that emissions and radiations from screen devices are so minute that they are not harmful effects on humans.

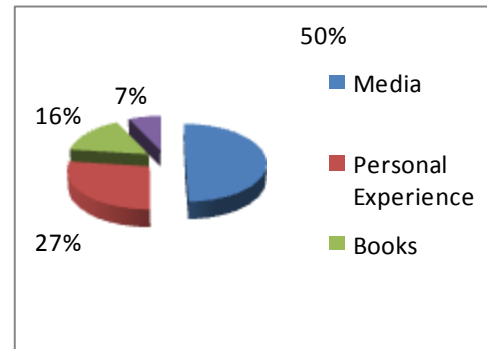


Figure 2: The Medium Through Which Health Information On Screen- Based Technologies Is Acquired.

Figure 2 shows that half of the students (50%) acquired health information on screen-based technologies through the media; 27% of among them acquired theirs through personal experience; 16% of them acquired theirs through books, while 7% got theirs through word of mouth. This explains that the media are the main vehicle through which these students acquire health information on screen- based technologies.

Table 8 : Respondents' Knowledge of the Growing Awareness on the Health Hazards Associated with Screen-Based Devices

	Knowledge of Growing Awareness	Need for more Sensitization Campaigns	Recommendation of Protective Devices from Producers
Yes	100%	100%	100%
No	0%	0%	0%
Total	100% (n=396)	100% (n=396)	100% (n=396)

Considering the need for public attention on the health hazards associated with screen-based devices, all the students admitted to being knowledgeable of the growing awareness of the health hazards associated with screen-based devices; acknowledged the need for more sensitization campaigns and recommended protective devices from the producers.

Table 9 : Ways Through Which Health Hazards of Devices Can Be Mitigated

	Percentage
Reduction in time devoted to the devices	51%
Use of Protective Devices while using the technologies	19%

Use of comfortable furniture	19%
All of the above	11%
Total	100% (n=396)

In terms of the measures to address the health hazards associated with screen devices on the users, data in Table 9 shows that, slightly above half of the students suggested a reduction in time devoted to the devices; 19% among them, suggested the use of protective devices; also 19% of them suggested the use of comfortable furniture while 11% suggest all the above mentioned.

D. Analysis of the Focus Group Discussion (FGD)

As stated earlier, the FGD was essentially employed in this study to further gain insight and explore the trends and critical issues raised from the quantitative data.

1) Students' Exposure and Use of Screen Based Devices

The quantitative data as analysed established that undergraduate students in Southeast Nigeria are highly exposed to screen-based devices; as majority of them not only have access to the devices but actually own the devices. This therefore entails constant usage of the devices as evident in the huge amount of time they often devote to using them. These findings from the quantitative data recurred in the FGDs.

Unlike in the survey, participants in this discussion were exhaustive in admitting to their access and exposure to screen devices. Apart from this acclaimed wide exposure, the participants also disclosed very differing views as per their frequency of exposure.

Respondent 10: Me, am not into social media so much, perhaps I spend roughly 3 to 4 hours daily because I play PSC 2 (video game) at home with friends. Then I go to cyber café for research when am not able to recharge my modem so I go to the café to do all my stuff. And use my phones but not so much into the social media. That's why I can say it's about 4 hours I make use of the gadgets.

Respondent 6: I use my phone all the time, I use it to do my assignments, and I use it to do everything do-able, am always with my phone. I think in a day I spend not less than 6 or 8 hours on my phone and the TV.

Respondent 11: I use my phone like practically the whole day alongside my laptop, sometimes TV, so I spend on estimate like 10 hours on them per day.

Respondent 3: In as much as I use phones for making and answering calls and browsing, I equally use (it) for watching movies, playing music of different types, in fact assorted types of music are in my phone. There are also assorted types of pictures in my phone,

including many down loads and the rest of them. You know smart phone these days is fun, man, it keeps one busy. No long things.

From the responses of these participants one can decipher easily that undergraduates more frequently utilize screen-based devices for a variety of reasons. It is also worthy of note that these students mainly utilize the mobile phones, not only for making voice calls, but also for surfing the web, playing variety of music, accessing pictures, and exchanging files. Apart from that, it is understood that they devote much time watching the television, playing video games and watching movies. This is indicative that students, apart from being widely exposed to these technologies, utilize them frequently, just as the 3rd respondent admitted to spending approximately, 10 hours per day on mobile phones, laptops and television. Other respondents further subscribed to this view.

Respondent 5: Like others said, making calls and all that, I use it in playing games and also playing music

Respondent 9: I use them all the time, take them along with me. Everything we are doing, I do it with my phones and laptop. For the television, I use it to watch movies, especially African magic... Ah, hardly do I watch news, you know women na, we don't like news, it's like boring and most times it's repetition of news. Not that I don't sit and watch the news, but I do that occasionally. In fact, most of the time, I stumble into news and if am disposed am forced to watch. But many times I watch soap operas on the TV, all these Wale Adenuga productions. So cumulatively, I spend like 3 and 5 hours daily on TV, phone and laptop. Yes before I forget I like playing games on my phone and laptop.

Respondent 6: It is the same thing with Chidimma. I use it for calls, for interactions on social media, like chatting and computer games, a little time for TV and other stuffs that will just come up.

Still on the level of exposure and usage, this discussion further exposed that students, apart from watching interesting programmes on television, also surf the web, chatting on the social media. Therefore, the students' high level of usage of the screen devices by the respondents concurs with the data generated from the quantitative study.

E. Factors Influencing Student's Pattern and Frequency of using Screen Devices

Based on personal motives for using the devices, data generated from the quantitative design shows that there are various individual needs and appeals that lure the students into using the various technologies these go the gamut of entertainment needs, affective needs, 'relaxation' to 'belongingness'. This conforms with earlier data that respondents admitted to spending greater amount of time utilizing the technologies.

Respondent 3: The need to be in touch with my relatives and friends in distant places like those living outside the country or that are not in the same state with me actually spurs me to frequently utilize my mobile phone to maintain contact with them. So you have to be in touch with them, you have to contact them, call them and the rest of them, chat with them. Also, actually I go to cyber café and make use of their desktop or laptop. I go there to browse, to do some assignments and to print it (them) out because it is easier to print things out after browsing than using your phone. So it's also a factor that influences me.

Respondent 6: On a regular school day I use it more often to call my course mates and also to browse, to know the announcements from the class rep because my class rep make(s) use of the social media and if you don't join the social media you won't get the necessary information, especially fixed lectures and all that. So I use it mainly for that. And after lectures my course mates go there to interact, to express themselves about the lectures. So after that, if there is (are) assignments to do and sometimes some lectures make use of this stuff. They will just tell us something to investigate through on line in the class. So when I get home I relax with it when am free (I) play music, browse, watch movies.

Respondent 5: Entertainment is one of them. For example, I can be back from a lecture and there is no light and no friends or siblings to interact with, I can just call a friend and say hey! Let's chat on face book and we can just chat and I can be entertained by chatting or going to video station to play game.

Respondent 4: In as much as I have something to out to paper, I will always eeh (unfinished expression), though it has become part of me that when I get back home now I will take bath, may be find something to eat. The next thing is to my laptop. Once I look at that laptop I have something to put, as in, where I stopped previously in my work, definitely I will have something to put that's how my inspiration comes.

Respondent 1: Besides the original use of phone, that is making and answering calls, what influences me in using this phone is because of news because I like information a lot, to know what is happening and that is why I browse the internet, using my phone or my friends' systems (laptops). I specifically bought this my Nokia CI because it was the reigning phone then. All my friends bought it and I didn't want to be the odd man out, after all I could afford it then. But today, there are other better and more sophisticated phones and am older and wise, so no need to run crazy about phones as new ones will continue to be produced and the one you think is the latest will soon be a kind of old fashion

The participants equally admitted that the screen-based technologies offer them the platform to satisfy their various needs. The 3rd participant pointed out that mobile phones and the internet enable him to communicate with friends and relations especially those not living close; carry out research work, and

send emails. This is analogous with the stand of the 1st participant that apart from use of mobile phones for making voice calls, he utilizes it for reading the dailies. The rest equally admitted that they often visit the cyber cafes to further browse and print out certain vital information while using the social media for more interactive communication. It is therefore deduced that the individual needs of the participants at greater extent informs their frequency of use of the screen-based technologies.

F. Awareness of Health Implications Associated with the Use of Screen Devices.

All the respondents: Yes, yes, yes! (Chorus answer) We are aware that there are health hazards associated with the use of screen devices.

Moderator: How do you know there are health implications in using these devices?

Respondent 2: it's there in some books. I have also seen some write-ups about the harmful effects of the TV, phones and computer sets on the internet. I think I have also heard about that in one or two radio programmes. Am not too sure again whether I heard the discussion on the radio or TV, But am sure have heard the dangers of those stuff in the media. Meanwhile, I have seen people talk about the dangers of using those devices.

Respondent 7: Oh I have seen stuffs like that on the internet but I never believed it, until one of my uncles talked about it in one of our discussions. That was when I began to think about it that it could be true o! But I think practically everybody knows that one way or the other that anything that has merits must have their own demerits.

Respondent 12: the knowledge I have in science tells me that signals of all these gadgets that have transmitters like phone signals, television signals are not too good to health. When I did my IT (industrial training) in a television station I used to go to the transmitting station and the engineers there are given milk to drink every day. When I asked them why taking the milk daily, they say the emission from the transmitter is harmful to human health, so that the milk will help reduce the impact of the emissions on them. No wonder if you keep your phone close to a sound system, say radio or television set and you have an in-coming call or text message, there will be a kind of vibrating noise from the speakers of the electronic sets.

Aside the observed high level of exposure and use of the technologies by these participants, it was gathered that they were predominately aware of the health implications of the devices. The 2nd participant pointed at literatures, books and radio programmes as her medium of exposure, the 7th participant pointed at the internet while the 12th participant revealed to have earlier perceived that electronic signals from the technologies could have harmful effect on them. This shows that the

respondents are insightful of health implications of the devices.

G. Students' Experience of Some of the Health Challenges Associated with Exposure to the Screen Devices

Respondent 6: It has effects to (on) the eye, using the phones, the PCs, the TV. For example, if you are using it frequently, surely one day you will have eye problem like I do. That's at times I will be using the phone, I will be having this kind of tears dropping. Sometimes after using it I will not be able to see too well. May be when somebody will be coming I will not capture (see) the person on time until the person comes closer or does something. Sometimes it do (does) affect me but not always but once I take one or two pills like that I will be able to recover. That is one of the effects. Apart from the issue of finger nails painning us when we press our computer and phones; and back pains because of my posture, it also attracts germs. For example everywhere I go, I go with my phone. If I go to toilet, bathroom I go with my phone and so because of that we forget cleaning the phones. I just wash my hands when am out of the toilet or when I soil my hands in the kitchen or elsewhere with the phone in my pocket and I don't bother to clean the phone as well so you might just answer a call afterwards and start eating something like cake, chin-chin from there you will contact diseases.

Respondent 7: Just like Chidiebere said it has effect on the eyes and most especially at night. It is not all that good to go close to either the laptop or the desktop computer. And as for the phone, whenever you are too busy with the phone, like some people like us who do live with their parents it distracts us from may be when our parents needed help from us because we get too addicted to it as if we are incomplete if we don't use them.

Respondent 8: It also has effect to (on) the ear like those one(s) that like listening to music with ear piece all the time it does affect the ears. That's all I know some people say but truly I have not seen anybody who has told me that he or she is having ear or hearing challenges because of using the ear piece. Those am sure suffer one form of hearing disorder or another are factory workers that use very noise machines to work.

Respondent 12: what I know it causes to people is addiction and addiction as I know is hmmm ... not strictly a health issue but psychological. Although, some psychological issues lead to serious health problems, yeah I think addiction is one of them. Here you talk of addicted to their phones and laptops. Some people are addicted to it that they can't even help their parents at home, can't carry out their home work. They are always on facebook. Some of them will browse from morning till night. And when you check it out you will still see that some of them are browsing pornographic things, things that are not even helping them, things are abhorred generally by

the society. In a nut shell, I can just say that it really leads to addiction for those who it can influence.

Respondent 10: I think it breaks the body system down because there is time for everything as the bible said. So when you are meant to sleep and you are watching the TV set or other stuffs it's time for you to wake up, you will be sleeping and sometimes people miss their schedule. So when you wake up you won't feel all that strong enough or healthy. So it breaks the system down totally.

Respondent 9: It causes high blood pressure, in the sense that I used to watch TV and in the CNN it's all wars and wars. I mean most of their newscasts consist of wars, crisis and everything, and I will say is this world coming to an end, see blood everywhere. Just as he (John Egbunna) said, it breaks someone down. It causes blood pressure and sometimes it makes you not to be stable in what you are doing. I also hear there is radiation from the TV, but especially the phone and computer causes cancer of the skin, that is, skin cancer.

Respondent 2: The screens affect our sight. Like me I like TV a lot and after so long time of exposure I now use glasses, and today I can't watch TV or do something on the system (computer) and my phone without my glasses because if I do, after watching I will have blurred vision, everywhere becomes dark for a while. So it really affects my sight. Also whenever I am not with my glasses and I make use of computer or my phones to read or chat and my head aches. I feel the same serious headache whenever I listen to music on the phone using ear piece with loud volume.

Respondent 3: It can damage our ear drum. I mean connecting a headset to the phone, tuning it to the highest volume and then playing songs, it damages our ear drum. And I heard a specialist over (on) the radio saying that using a telephone frequently on the right side of the ear causes cancer. My uncle once complained that em ... he puts his phone in the vibration mode always, and then each time he takes his phone off his pocket, intermittently he feels one of his legs vibrates because the phone used to be in that particular side of pocket of his trousers.

Respondent 1: Whenever am on my phone, of course am always with my phone. So after doing what am doing I always have headache and body pains like I will be having pains in one of my hand(s). But when I stop it I will discover that it (the pains) will stop.

Respondent 5: Apart from those muscle pains, it can make someone fall sick. For example just like my younger sister, she can chat from now till tomorrow morning and she won't bother about food so far her phone or ipad is on she is chatting with her friends, food is not in her mind. And someone not eating from morning, afternoon and night can fall sick.

Moderator: But has she been sick because of that?

Respondent 5: Yea and our father used to beat the hell out of her because of her attitude.

Respondent 4: Mine is that after typing, I discover that my fingers are hanging. I mean if I try to stretch them it will be a problem because when I get home, you know, from 8 o'clock (pm) to 10pm am on the system (computer) and it is always every day I will be on the system. So each time am off (from the system) my hand will be like this (hanging). Even when I want to take my bath, I will find it difficult; it's just by the grace of God that I will stretch it within eh up to five minutes.

Respondent 11: I also discovered that using my phone and watching TV late in the night affects my sleep. I actually had experiences, even last night, I was watching movies with my phone up to 3 o'clock in the morning and I couldn't sleep thereafter. I tried to sleep for like throughout that time I couldn't sleep up to 5am I couldn't sleep. So it distorts my sleep.

Interestingly, these students further exposed the various peculiar health challenges they encounter owing to their consistent exposure to screen based technologies. Participant numbers 6, 7 and 12 revealed to have suffered different forms of eye disorders owing to their exposure to the devices as well as possible exposure to pornographic contents. Participant numbers 8 and 3 said the devices could lead to protracted ear problems, participant number 5 pointed out that the devices could lead to several ailments having witnessed from her sister who spends greater part of her time on the social media. Participant number 4 made mention of her finger hanging up after prolonged pressing of phones. Participant number 9 also revealed that the devices could lead to high blood pressure especially when exposed to sad news or violence. While number 7 said the devices negatively affects his programme schedule.

VI. ANALYSIS OF RESEARCH QUESTIONS AND DISCUSSION OF FINDINGS

This study focused on undergraduate students' awareness of the possible health implications, following their exposure to screen-based technologies. It sought to address the following research questions:

1. To what extent are university students in Southeast Nigeria exposed to electronic screen-based devices?
2. What possible factors influence these students' level of exposure to the devices?
3. To what extent are these students aware of the health implications associated with exposure to screen-based devices?
4. What are their views on ways such health implications could be tackled?

The first research question reads: 'To what extent are university students in Southeast Nigeria exposed to electronic screen-based devices? This

formed the entry point upon which further enquiries were made because of the need to first discover the students' exposure to the devices. Our data addressed this research question. It is remarkable however that 100% of the respondents admitted to having access to screen-based devices, which indicates a high prevalence and accessibility of screen-based devices among students. Again, nearly half of the respondents own mobile phone, given at 49%; 27% own a television; 22% own a computer/laptop and 2% own a PSP game gadget.

While 50% of them opined that the mobile phone is more accessible to them; 28% indicated having more access to television; those that have access to computer/laptop constitute 19%; PSP game gadget is 3%. Meanwhile, 40% of the respondents went further to express their exposure to mobile phone; 34% were more exposed to Television; 22% were more exposed to computer/laptop, while 4% were more exposed to PSP game gadget. These findings generally illustrate that the Nigerian undergraduate student is highly exposed to screen-based devices.

Also, we established our Focus Group Discussions, that the students more frequently utilize screen-based devices for a variety of reasons; not only for making voice calls, but also for surfing the web, playing variety of music, accessing pictures, and exchanging files. They also devote much time watching television, playing video games and watching movies. This is also indicative that students, apart from being widely exposed to these technologies, utilize them frequently, just as the 3rd respondent admitted to spending approximately, 10 hours per day on mobile phones, laptops and television. Other respondents further subscribed to this view.

Additionally, more than half of the respondents represented by 57% make frequent use of screen devices; 41% utilize the devices occasionally; while 2% sometimes make use of the devices. In terms of quantity of time spent on the technologies, 48.7% of them spent 0-5 hours using the electronic devices; 23% spent 6-10 hours; while 28.% spent 10 hours and above, which suggests that majority of the undergraduate students spent huge amount of time engaging with their electronic device and this invariably suggests the high propensity of being exposed to health hazards associated with the use of screen-based electronic devices. The discussion further revealed that students, apart from watching interesting programmes on television, also surf the web, chatting on the social media.

The second research question reads: What possible factors influence these students' level of exposure to the devices? This is quite relevant owing

to the need to ascertain the likely factors influencing the students' level of exposure. Data in tables 1 sought to address this question. It is interesting however that the entire students admitted there were factors influencing their use of screen-based technologies which is indicative that various individual needs and appeals lure them into using the various technologies. The respondents also wholly utilize them to satisfy their entertainment needs, affective needs, 'relaxation' as well as 'belongingness'; with greater amount of their time spent utilizing the technologies.

The third research question states: To what extent are these students aware of the health implications associated with exposure to screen-based devices?

Data on tables, 2, 3; and in figure 2, addressed the question. For instance, all the students were aware of the health implications associated with use of the technologies while nearly all of them (99%) experienced the health challenge which attests to a high level effect of the technologies on the users. Again, 53% of them admitted to have experienced sight challenges; 5% of them experienced ergonomic problems; 42% experienced body pains while none of them claimed to have developed cancer which illustrates that majority of the students are challenged by sight problems owing to their exposure to the technologies. While half of the students (50%) got health information on screen-based technologies through the media, 27% of them got theirs through personal experiences; 16% of them got theirs through books and 7% get theirs through word of mouth, which means that the media are the main vehicle through which the people got health information on screen-based technologies.

Also, data presented in table 4, alongside the responses from the focus discussion, further addresses the above question. Concerning the need for public attention on health hazards of screen-based devices, all the students admitted to being knowledgeable of the growing awareness of health hazards associated with screen devices; acknowledged the need for more sensitization campaigns and recommended protective devices from the producers.

Interestingly, these students further revealed the various peculiar health challenges they encounter owing to their consistent exposure to screen-based technologies. Participant numbers 6, 7 and 12 revealed to have procured different forms of eye disorders owing to their exposure to the devices as well as possible exposure to pornographic contents. Participant numbers 8 and 3 said the devices could lead to protracted ear problems; participant number 5 pointed out that the devices could lead to several ailments, having witnessed such from her sister who

spends greater part of her time on the social media. Participant number 4 made mention of her finger hanging up after prolonged pressing of phones. Participant number 9 also revealed that the devices could lead to high blood pressure especially when exposed to sad news or violence. While number 7 said the devices negatively affects his programme schedule. This explains that the technologies pose severe threats not only on the health but also on the social and psychological well being of users. However, despite this growing awareness on the possible health hazards associated with constant usage of these devices, the students sampled still made great use of the devices. This could be informed by the perceived enormous advantages the devices offer them.

Research question four states: 'What are their views on ways such health implications could be tackled?

For instance, slightly above half of the students suggested a reduction in time devoted to these devices; 19% among them suggested the use of protective devices; also 19% among them suggested the use of comfortable furniture while 11% suggested all the foregoing.

VII. CONCLUSION/RECOMMENDATIONS

The findings from our study reinforces previous research findings by adding Nigerian student's perspective to the already existing discourse on the prevalence of health challenges faced by people, who are heavily engaged with screen-based technologies. As stated earlier, and from our findings, most students have access to the devices, as each one of them; at least, have a phone, which is one of the screen devices.

Against the backdrop of our findings, the following recommendations were made:

- The Management of the various Universities in Southeast Nigeria should utilize the media stations in their university communities, to educate their students on the prevailing health implications associated with their use of screen devices as well as the precautionary measures they should take to help curtail the health challenges thereof. (for example Nnamdi Azikiwe University can carry out this task using its radio station called UNIZIK FM; while Godfrey University Ugwumu-Nike, Enugu can do same using its Go-Radio station)
- The University Management should regularly organize lectures, teachings, seminars and conferences within the University to sensitize students on precautionary measures they should adopt to reduce the attendant health risks associated with screen devices. Such precautionary measures include reducing the brightness of the computer, television or the phones while using them at night.

- Students should also be admonished not to use their screen devices late in the night as that could cause sleep disorder, thereby affecting the body system.
- Producers and marketers of screen devices should be encouraged by various regulatory agencies the Standards Organisation of Nigeria (SON) to boldly print in their manual, necessary advice or directions on the use of screen devices. This is important as the tiny font sizes of the directions in the manuals could discourage people from reading them.
- Government agencies and Non Governmental Organizations should regularly educate people and create awareness on the dangers of exposure to screen-based technologies.
- The media in collaboration with concerned bodies and government should also sensitize people on the need to reduce the health risks associated with exposure to screen devices.

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