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An Assessment of Internet Use and Cyber-risk Prevalence among Students in Selected Nigerian Secondary Schools

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Abstract

The use of the Internet has become highly pervasive among adolescents. While these people derive numerous benefits from their use of this technology, they are also faced with a challenge of being exposed to many cyber risks. Nigeria is a developing country with a teeming population of adolescents who are regular users of the Internet, but with inadequate research on adolescent Internet safety. There is therefore, a need to conduct studies on child online risks in Nigeria, to help evaluate the enormity of child online abuses. The present study investigated Internet use and cyber-risk prevalence among four hundred secondary school students from a Nigerian state capital. This study employed a survey research method. The findings reveal that students in selected secondary schools in Ibadan metropolis are regular users of the Internet with considerable exposure to different cyber-risk behaviours. Male students are significantly more susceptible to cyberbullying than female students while public school students are more susceptible to cyberbullying and sexual solicitation risks than private school students. The study amongst others, recommends that Information Technology professionals and educators should intentionally get involved in enlightening students on the importance and means of ensuring safety while they use the Internet.

Keywords

Adolescent, Internet Safety, Secondary School Student, Oyo State, Nigeria

INTRODUCTION

The Internet is an important resource that is becoming highly imperative for both work and play among young ones. This technology has become such a defining feature in the lives of younger generations that it predicts a fundamental change in the way they communicate, socialise, create and learn (Helsper & Eynon, 2010). While these people stand to gain a lot of benefits of the new era, they are also faced with the challenge of staying safe in the face of numerous risks and security challenges posed by their exposure to the digital world.

Cyber-risks are a common phenomenon and children are not left out in their capacity, majorly as recipients, and sometimes as participants or actors (Gasser, Maclay, & Palfrey, 2010). This has fueled different reactions from parents and stakeholders. For example, some experts have urged parents to restrain their children from chat rooms and networking sites where Internet predators may lurk, while some parents ensure that their children avoid the cyberspace totally (Tynes, 2007), others however, advocated for evidence-based policies that will assist in balancing the goals of maximising opportunities and minimising risks of the Internet (Hasebrink, Livingstone, Haddon, & Ólafsson, 2009; Mascheroni, & Ólafsson, 2014; Espinoza & Juvonen, 2011). Furthermore, in the words of Haythornthwaite and Wellman (2008), 'It is time for further analyses on the Internet in everyday life'.

While researchers in the developed parts of the world have taken greater efforts in assessing and researching on this menace, their conterparts in the developing countries are yet to take up the challenge in an adequate measure (Opesade & Adesina, 2020). Nigeria is an Afican country with an enormous Internet growth; with the number of users reaching 103 million in May 2018 from 28 million Internet users recorded in 2012 (Premium Times, 2018). The Internet has also become increasingly accessible to young people, especially Nigerian children, both at home and in schools (Nigeria Internet Registration Association, 2016).

In spite of increased exposure to the networked world and the fact that the country has gained a level of notoriety for young people committing online fraud, and for children being harmed by strangers they have met online, very little attention is being paid in Nigeria to the issue of digital safety for children (Parenting for a digital future, 2018). According to The Eagle Online (2018), there is a need to conduct studies on child online abuses in Nigeria, to help evaluate the enormity of child online abuses, especially since the boom in Information and Communication Technology in the country have been unprecedented.

Internet risk covers a wide range of undertakings that have the possibility of causing harm, loss or any other unpleasant experiences while engaging in the cyber world. Although what constitutes cyber-risks is numerous, efforts have been made to broadly group them into manageable classes such as Internet dependence risk, cyber bullying, contact risk, content risk, conduct risk, commercial risk amongst others (De Moor et al., 2008; Gasser et al., 2010; Valcke, De Wever, Van Keer, & Schellens, 2011). In addition to these and other cyber-risk types that have been reported in the literature, a kind of unwholesome behaviour have been observed among Nigerian young Internet users. Global System of Communications (GSM) service providers in the country offer a post-paid service to customers, a service that enables customers to recharge their accounts such that payment could be made at a later time. It has however, been observed that after some customers benefit from this service, they discontinue with the use their Subscriber Identity Module (SIM) without paying for the borrowed credit. This behaviour which is termed in this study as 'Imprudent Recharge Risk' and which can be situated under the conduct, commercial risk of Gasser, Maclay, and Palfrey (2010) taxonomy of cyber-risk has not been reported on by any previous study.

The present study in a bid to shed light on these research gaps seeks to investigate the purpose of Internet use and prevalence of cyber-risks among secondary school students in the capital city of Oyo State, Nigeria. Most secondary school students in the city of Ibadan, the capital of Oyo State are comfortable and regular users of the Internet. There is however, a dearth of information on their levels of cyber-risk exposure. Furthermore, since these students possess different demographic characteristics, the present study seeks to identify the effect of these demographic factors (Sex, Age, School Type, Class) on their levels of cyber-risk exposure.

The main objective of the present study is to assess the levels of cyber-risk exposure among students in selected secondary schools in Ibadan Metropolis, Oyo State, Nigeria. The specific objectives are to assess students' levels of Internet usage; to identify students' purposes of using the Internet; determine students' levels of exposure to cyber-risk (Internet Addiction, contact risk, sexual solicitation, provocative content, cyberbullying, Imprudent Recharge Risk); to identify students' sources of advice on how to use the Internet safely; to compare the degrees of prevalence of cyber-risk types (Internet Addiction, Contact Risk, Sexual Solicitation, Provocative Content, Cyberbullying, Imprudent Recharge Risk) among secondary school students in Ibadan metropolis. Other sub-objectives are to determine the effect of demographic factors (Sex, Age, School type and Class) on students' levels of exposure to different cyber-risk types (Internet Addiction, Contact Risk, Sexual Solicitation, Provocative Content, Cyberbullying, Imprudent Recharge Risk), and lastly to determine the effect of

students'exposure to different cyber-risk types (Internet Addiction, Contact Risk, Sexual Solicitation, Provocative Content, Cyberbullying, Imprudent Recharge Risk) on one another.

Research Questions

1. What age did most students begin to use the Internet?
2. How often do students use the Internet either during normal school or normal non-school period?
3. What purposes do students use the Internet for?
4. What are the levels of prevalence of cyber-risks (Internet Addiction, contact risk, sexual solicitation, provocative content, cyberbullying, improper data possession) among secondary school students in Ibadan, Oyo state, Nigeria?
5. What are the students' sources of information on how to use the Internet safely?

Research Hypotheses

H_{01}: There are no significant differences in the levels of cyber-risk types' prevalences among students in selected secondary schools in Ibadan metropolis.

H_{02}: Demographic characteristics (Sex, Age, School type and Class category) of students in selected secondary schools in Ibadan metropolis do not significantly affect the prevalence of cyber-risks among them.

H_{03}: There are no significant relationships among students' levels of exposure to different cyber-risk types (Internet Addiction, contact risk, sexual solicitation, provocative content, cyberbullying, improper data possession)

BACKGROUND AND LITERATURE REVIEW

Children and Adolescent Internet Use

The Internet is a powerful technology that is amenable to use by different groups of people. The technology has opened up a new world of possibilities for all, especially, for the younger generations, who are well equipped with tools and skills to connect with, explore, and discover the world around them (Wong, 2010). Several benefits derivable from its use are also making its adoption to become gradually inevitable to children and adolescents. According to Tynes (2007), the Internet provides enormous educational and psychological benefits to adolescents. For example, adolescent participation in social online environments such as social networking spaces, chat rooms, and discussion boards can foster

learning that reinforces and complements what is taught in traditional classrooms. Their online social networking can also help in meeting their psychological needs such as facilitation of identity exploration, and provision of social cognitive skills such as perspective taking, and fulfilling the need for social support, intimacy, and autonomy.

Studies have also presented the Internet as an important resource for all-round development of children and adolescents. In a survey of 692 Australian 13 to 16 year-olds, Fleming, Greentree, Cocotti-Muller, Elias, and Morrison (2006) reported that the top six main reasons cited for using the Internet were for researching for homework tasks, talking to friends via instant messaging, downloading and/or playing games, talking to friends via e-mail, downloading and playing favorite songs and videos, and getting information about favorite TV shows and movies. The European Union Kids' survey reported that children under nine years old enjoy a variety of online activities, including watching videos, playing games, searching for information, doing their homework and socialising within children's virtual worlds (Holloway, Green, & Livingstone, 2013). A longitudinal field study carried out to examine the antecedents and consequences of home Internet use in low-income families carried out among 140 children between 10 and 18 years, indicated that children who used the Internet more had higher scores on standardized tests of reading achievement and higher grade point averages than did children who used it less (Jackson, von Eye, Biocca, Barbatsis, Zhao, & Fitzgerald, 2006). All these establish the fact that the Internet is an integral learning tool which, when used judiciously, promotes the language, cognitive and social development of young children (Holloway et al., 2013).

However, as some people turn to the Internet for positive reasons, so do some other people turn to the Internet to take out their frustrations and aggression (Kowalski, Giumetti, Schroeder, & Lattanner, 2014). Thus, the Internet also presents opportunities for those with criminal intentions, leaving its numerous users highly vulnerable to varieties of online risks (Choo, 2011).

Children and Adolescent Internet Risks

A number of concerns and Internet threats have arisen from uncensored and largely unregulated cyberspace (Livingstone & Smith, 2014). De Moor et al. (2008) outlined a number of cyber-risks among Belgian teenagers (age 12-18) as Internet dependence, excess mobile phone use, content risks such as pornography, violence and racism, illegal downloading, plagiarism, lack of critical sense; contact risk such as breach of privacy, cyber harassment, potentially harmful chat contacts; and commercial risk such as spam and aggressive marketing of mobile phone ring tones. Based on De Moor et al. (2008) synopsis, Valcke, De Wever,

Van Keer, and Schellens (2011) presented a structured graphical taxonomy of Internet risks for young children, as shown in Fig. 1.

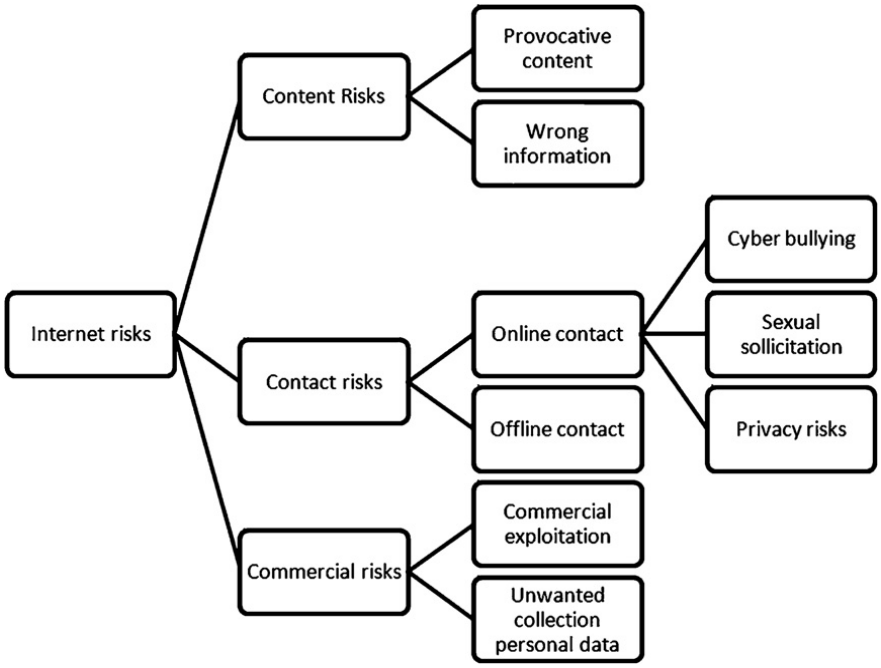

Fig. 1: Taxonomy of Internet risks (Valcke et al., 2011)

These risks have been classified as content risks involving exposure to provocative content and wrong information, contact risks subdivided into offline contact and online contact risk, and which may lead to cyberbullying, sexual solicitation or privacy risk, and lastly commercial risks including commercial exploitation and unwanted collection of personal data.

While working towards a deeper understanding of digital safety for children and young people in developing nations, Berkman Center for Internet & Society at Havard University, in Collaboration with UNICEF presented an exploratory study which shows the multiplicity and multidimensional nature of cyber-risks. The study also presents three classes of cyber-risk, namely, content, contact and conduct risks, and the possible roles a child can assume in those risks. According to them, as presented in Table 1, a child could assume the role of a recipient, participant or actor; none of which could be adjudged to be healthy either for the child that is involved or for the Internet community as a whole.

Cyber-risk Type	Commercial	Aggressive	Sexual	Value
Content (child as recipient)	Adverts, Spam, Sponsorship, Personal info	Violent or hateful content	Pornography or unwelcome sexual content	Bias Racist, Misleading info or advice
Contact (child as participant)	Tracking, Harvesting personal info	Being bullied, harassed or stalked	Meeting strangers, Being groomed	Self-harm, Unwelcome persuasions
Conduct (child as actor)	Illegal downloading, Hacking, Gambling, Financial scams, Terrorism	Bullying or harassing another	Creating and uploading inappropriate material	Providing misleading information or advise

Table 1: Child's Roles and multidimensional nature of cyber-risks (Gasser, et al., 2010)

In the words of Fleming et al. (2006), "Young people may visit violent or pornographic Internet sites by choice, but they may also be subjected to unpleasant materials and behaviors unwittingly". Also according to Valcke et al. (2011), ICTs have become a way for the manifestation of different risky online behaviors, that is, involvement in a number of situations that increase the likelihood of occurrence of negative consequences to self or others, such as emotional distress, victimisation or deterioration at the social or academic level during adolescence. This suggests that prevalence of cyber-risks can end up making young people to either become a prey or a predator in the cyberspace. Whichever the case may be, research has shown that cyber-risks all have a variety of negative effects on the younger generation (Fleming, Greentree, Cocotti-Muller, Elias, & Morrison, 2006).

Previous Empirical Findings

Studies on children and adolescents' exposure to cyber-risks revealed similar stories in different parts of the world. A study of Danish adolescents aged 14-17 years in 2008 reported that roughly half of the adolescents had met Internet acquaintances face to face, with few instances resulting in forced sex (five boys and nine girls) (Helweg-Larsen, Schütt, & Larsen, 2011). A survey conducted among Australian 13 to 16 year-olds showed that both males and females reported exposure to violent and sexual materials, with boys being more exposed to inappropriate materials and behaviors online than girls (Fleming et al., 2006). According to a study by Livingstone, Haddon, Görzig, and Ólafsson (2010), eleven percent (11%) of UK children, 11-16 year olds, have encountered sexual images online, 12% have received sexual messages, 3% have seen others perform sexual acts in a message and 2% had been asked to talk about sexual acts with

someone online. Twenty nine percent (29%) have had contact online with someone they have not met face to face and 4% have gone to an offline meeting with someone first met online. Nineteen percent (19%) have seen one or more types of potentially harmful user-generated contents such as hate messages (13%), anorexia/bulimia sites and sites talking about drug experiences (both 8%), while (2%) have visited a suicide site.

A study of Ghanaian Children 9-17 years revealed that about a quarter (22%) of them reported to have received sexual messages (in words, pictures or video) in the last 12 months. Five percent (5%) reported to have sent, shared or posted sexual messages (words, pictures or videos) in the past 12 months. Less than 20% of the children had experienced negative user generated content in the past 12 months. Most commonly, 18% reported to have seen websites or discussions online involving violent images, 46% had experienced content on ways to commit suicide and 45% on ways to harm or hurt oneself (Global Kids Online, 2018).

A survey of 2,041 children between the ages of 12 and 17 years in Lagos, Nigeria, revealed that seven out of every 10 of the boys have come across pornography online and five out of every 10 have intentionally accessed it, while six out of 10 girls have come across pornography online and nearly three out of 10 of the girls have intentionally accessed it. Fifty-four percent of the girls say that someone has attempted to have a sexually explicit conversation with them online while 25% of the girls say that someone has asked for a nude or semi-nude picture of theirs online where 7% of these girls acceded to such requests (Parenting for a digital future, 2018). Another report revealed that 54% of Nigerian children between eight years and twelve years are exposed to one or more types of cyber-risks. The most prevalent cyber-risk was found to be victimisation by cyberbullying (37%), followed by exposure to inappropriate content (16%) and video game addiction (14%) (Ogunfunwa, 2018; Ajanaku, 2018).

Research has also shown significant relationships among different types of cyber-risks. For example, (Gámez-Guadix, Borrajo, & Almendros, 2016) reported that adolescent problematic Internet use can increase the perpetration of cyberbullying and meeting strangers online while meeting strangers online can also increase the likelihood of cyberbullying perpetration.

RESEARCH METHODODOLOGY

This study employed the survey research method. The approach was adopted in order to enable the researchers to collect quantitative data for analysis that would provide plausible findings on levels and variations in the Internet use and cyber-risk prevalence among the target population. The target population of the study comprised all secondary school students in eleven (11) local government areas in Ibadan, the capital of Oyo State, Nigeria. Simple random sampling technique was used to select two local government areas (Ibadan North and Ibadan South West) in the metropolis. Two public and two private secondary schools were selected from each of the two local government areas to make a total of eight secondary schools. Simple random sampling was used to select the public schools and private schools that were in their vicinity. This is to ensure that data on students are from similar jurisdictions. Fifty students, divided equally among the senior and junior schools students, were selected from each school.

A well-structured questionnaire adapted from a previous study, Risks and safety for children on the Internet: The UK report (Livingstone, Haddon, Görzig & Ólafsson, 2010) was used as an instrument for data collection. The questionnaire comprises nine sections. Section A contains demographic information of the respondents, Section B consists of questions on Internet use. Section C – Section H contain questions on cyber-risk exposure namely, contact risk, Internet dependence, sexual solicitation, cyberbully, provocative content and imprudent recharge risk respectively. While the first five cyber-risk types were adopted from previous studies, the sixth type, imprudent recharge risk, was introduced in the present study based on an observed conduct risk among young Internet users in Nigeria, but which has not been tested in previous studies. Section I contains information on students'sources of information on online safety. Four hundred copies of the questionnaire were administered to students out of which three hundred and ninety two (392) were retrieved, giving 98% response rate.

RESEARCH FINDINGS

Demographic Characteristics of the Respondents

Table 2 presents the demographic characteristics of respondents in the present study.

Variable	**Measures**	**Frequency**	**%**
Gender	Male	165	42.1
	Female	222	56.6
	No response	5	1.3
Age	Less than 10	23	5.9
	10-12	143	36.8
	13-15	176	45.2
	16-18	44	11.3
	Above 18 years	3	.8
	No response	3	.8
Class	JSS	194	49.5
	SSS	192	49.0
	No response	6	1.5
School Type	Public	200	51.0
	Private	192	49.0

Table 2: Demographic Characteristics of Respondents

As shown in Table 2, male students account for 42.1% of the respondents, while females account for 56.6%. The largest proportion of respondents are those within the age group 13-15 years, followed by age group 10-12 years. Junior Secondary School (JSS) students constitute 49.5% of respondents while 49.0 % of respondents are accounted for by the Senior Secondary School (SSS) students. Public school students account for 51% while private school students account for 49% of the total respondents.

Answers to Research Questions

Research Question 1: What age did most respondents start using the Internet ?

The distribution of ages that respondents started using the Internet is as presented in Table 3.

Variable	Measures	Frequency	%
Internet Startup Age	Less than 7 years	2	.5
	7-9	159	40.6
	10-12	173	44.1
	13-15	49	12.5
	No response	9	2.3

Table 3: Students' Internet Startup Age

As shown in Table 3, majority of students (44.1%) in selected secondary schools in Ibadan metropolis started using the Internet within the ages 10-12 years, followed by those (40.6%) who started using the Internet within the ages 7-9 years old.

Research Question 2: How often do students use the Internet either during normal school or normal non-school period?

The results of the analyes to derive answer to this question is as shown in Fig. 2.

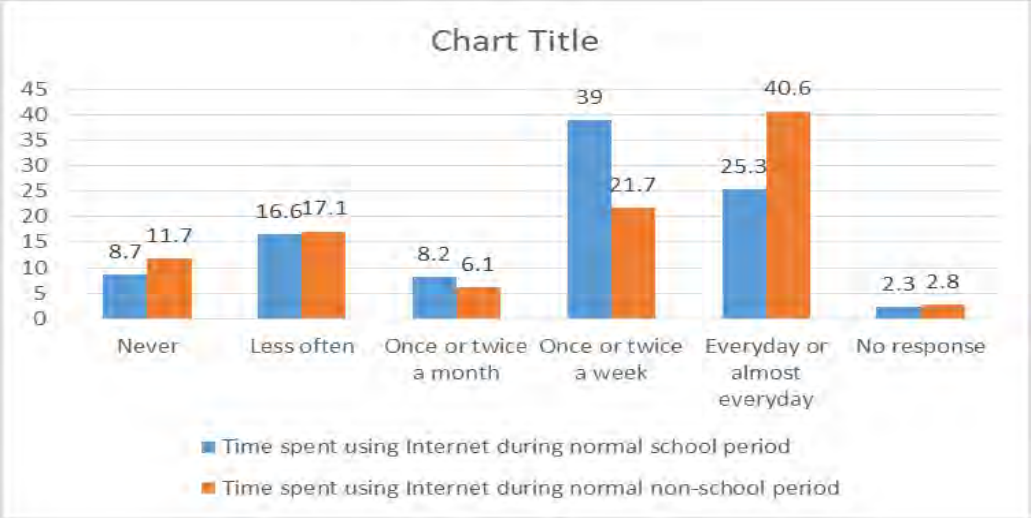

Fig. 2: Frequency of Internet use

As shown in Fig. 2, most students (39%) use the Internet once or twice in a week during normal school periods while majority (40.6%) use the Internet everyday or almost everyday during normal non-school periods.

Research Question 3: What purposes do students use the Internet for?

Fig. 3 presents the result on what the students use the Internet for.

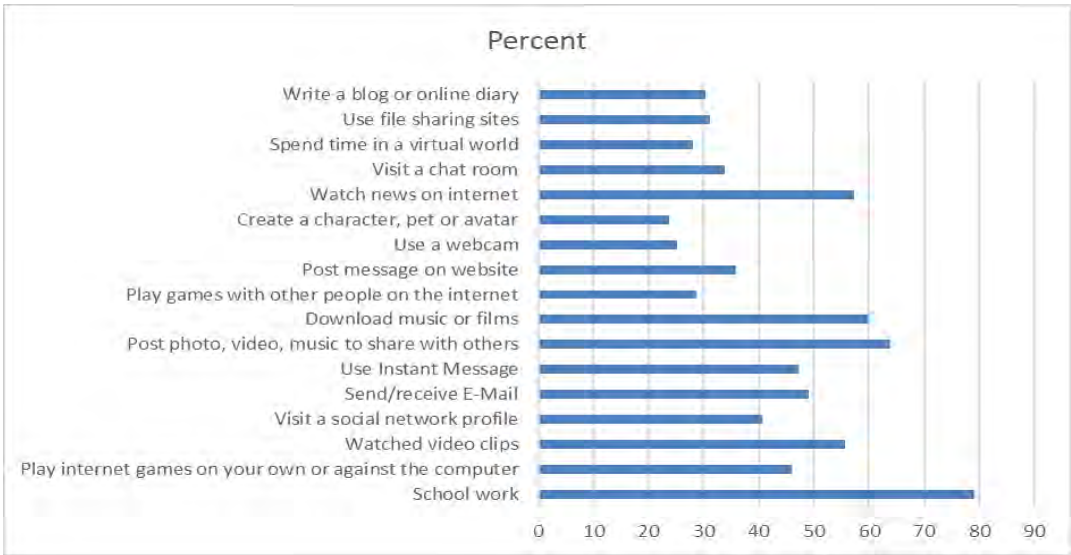

Fig. 3: Purpose of Internet Usage

As shown in Fig. 3, out of seventeen possible purposes of using the Internet that were presented to the students, the use of the Internet for school work emerged the highest (79.1%). This is followed by its use for posting photo, video, music to share with others (63.8%), to download music or films (59.7%), to watch news on the Internet (57.4%), and to watch video clips (55.6%). The last three purposes are to spend time in the virtual world (28.4%), use a webcam (25.3%) and lastly to create a character, pet or avatar (23.7%).

Research Question 4: What are the levels of prevalence of cyber-risks (Internet Addiction, contact risk, sexual solicitation, provocative content, cyberbullying, improper data possession) among secondary school students in Ibadan, Oyo state, Nigeria.

Results of the analyses to derive answers to the Research Question 4 are as shown in Fig. 4 – Fig. 9.

Fig. 4: Prevalence of Contact Risk among Students

As shown in Fig. 4, 60.7% of students have ever looked for new friends on the Internet, 58.7% have ever added people to their friends list or address book that they have never met face to face, 31.3% have ever sent personal information to someone that they have never met face to face while 32.4% have ever sent a photo or video of themselves to someone that they have never met face to face.

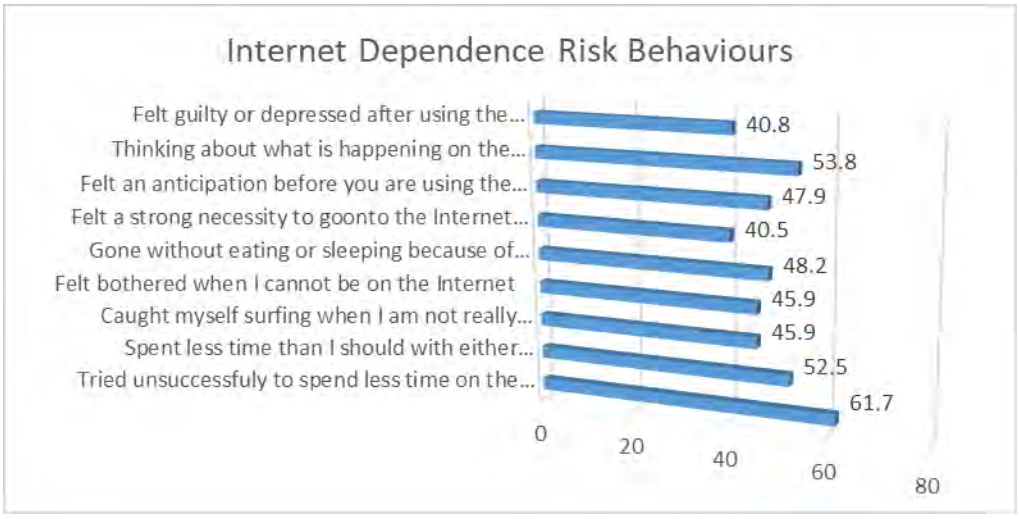

Fig. 5: Prevalence of Internet Dependence Risk among Students

As shown in Fig. 5, 61.7 % of students have ever experienced trying unsuccessfuly to spend less time on the Internet, this is followed by those who

have ever engaged in thinking about what is happening on the Internet when they are not using it (53.8%), this category is followed by those who have ever perceived spending less time than they should with either family or friends (52.5%). About 48% have ever gone without eating or sleeping because of the Internet, 47.9% have ever experienced a feel of anticipation before using the Internet. About 46% have ever caught themselves surfing when they are not really interested, the same percentage have also ever felt bothered when they cannot be on the Internet. A feel of guilt or depression after using the Internet for a long time have been experienced by 40.8% of the students while 40.5% of them have ever felt a strong necessity to go onto the Internet when they are not online.

Fig. 6: Prevalence of Sexual Solicitation Risk among Respondents

As shown in Fig. 6, 56.4 % of students have ever have seen images or video of someone naked on the Internet, this is followed by those who have ever seen a sexual message posted where other people could see it on the Internet (46.7%). This category is followed by those who have ever seen images or video of someone having sex (43.3%). About 43% have been asked to talk about sexual acts with someone on the Internet, 42.1% have seen images or video of someone's private parts. About 40% have seen images or video or movies that show sex in a violent way, 35% have been asked on the Internet for a photo or video showing their private parts while 34.5% have been sent a sexual message on the Internet.

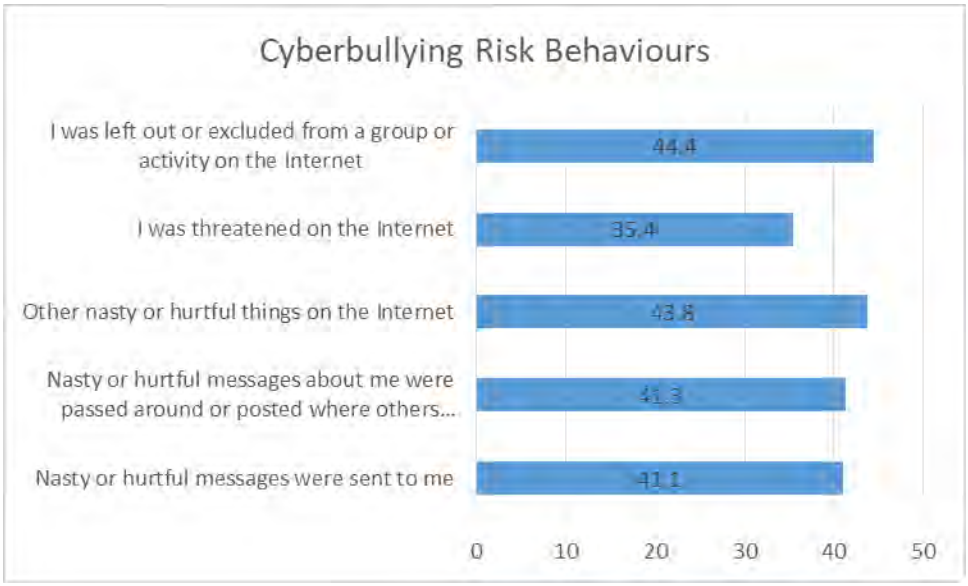

Fig. 7: Prevalence of Cyberbullying among Respondents

As shown in Fig. 7, 44.4 % of students have ever experienced being left out or excluded from a group or activity on the Internet, 43.8% have experienced other nasty or hurtful things on the Internet, 41.3% have experienced nasty or hurtful messages about them being passed around or posted where others could see it. Nasty or hurtful messages have ever been sent to 41.1% while 35.4% have ever been threatened on the Internet.

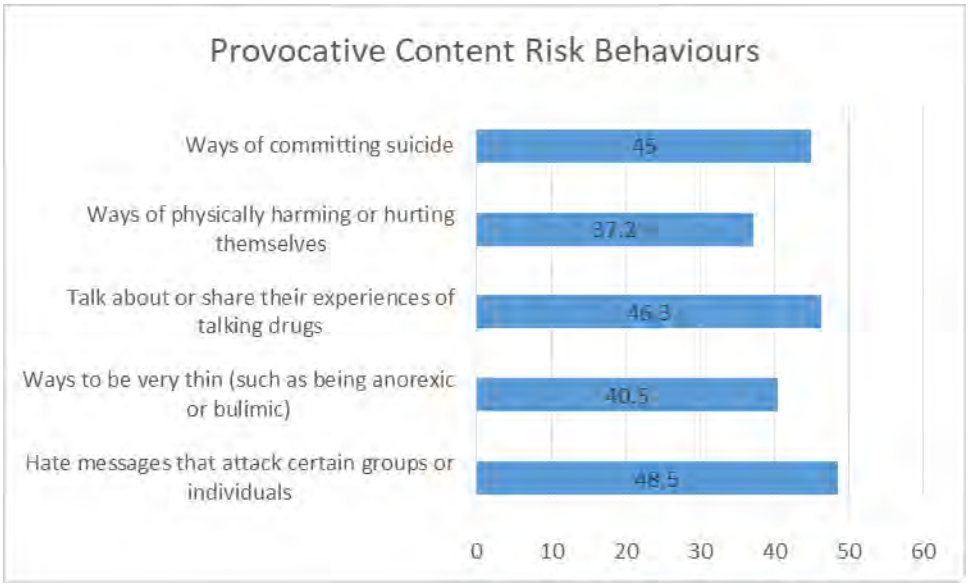

Fig. 8: Prevalence of Provocative Contents among Respondents

As shown in Fig. 8, 48.5% of the students have ever seen hate messages that attack certain groups or individuals. This is followed by those who have seen content on some people's experiences of talking drugs (46.3%), others include those who have ever seen content on ways of committing suicide (45%), ways to be very thin (such as being anorexic or bulimic) (40.5%), and lastly those who have seen content on ways of physically harming or hurting oneself (37.2%).

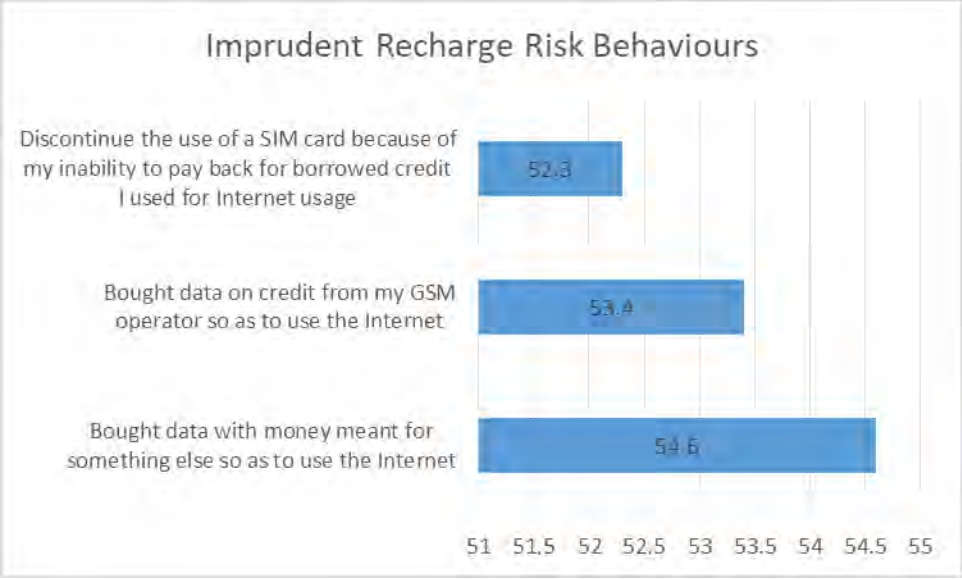

Fig. 9: Imprudent Recharge Risk

As shown in Fig. 9, 54.6% of the students have ever bought data with money meant for something else so as to use the Internet, 53.4% have ever bought data on credit from their GSM operators so as to use the Internet, while 52.3% have ever discontinued the use of a SIM card because of their inability to pay back the borrowed credit they used for Internet access.

Research Question 5: What are the students' sources of information on how to use the Internet safely?

Students sources of information on Internet safety are as presented in Fig. 10.

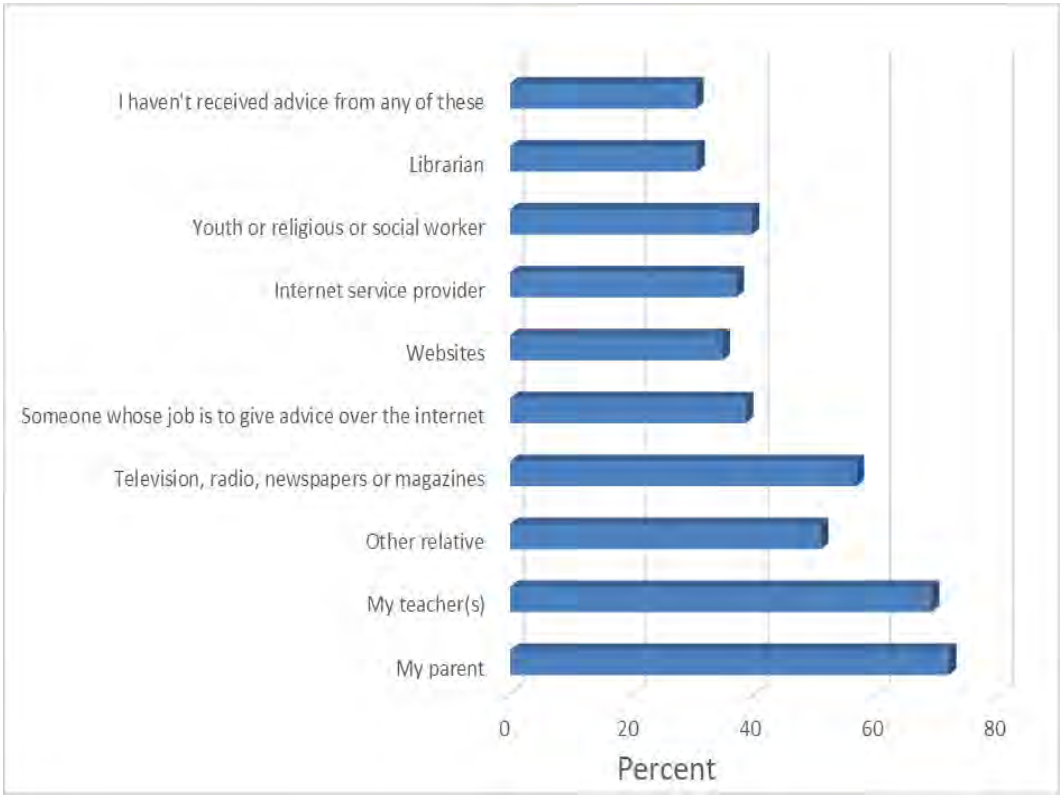

Fig. 10: Students' Sources of Information on Internet Safety

As shown in Fig. 10, parents are the most prominent sources of information on Internet safety for the students, followed by teachers, and then, mass media (television, radio, newspaper or magazines). Other sources include relatives, youth, religious or social workers amongst other sources.

Tests of Research Hypotheses

H_{01}: There are no significant differences in the levels of cyber-risk types' prevalences among students in selected secondary schools in Ibadan metropolis.

To compare the degrees of prevalence of cyber-risk types among secondary school students in the study, the mean of each cyber-risk was computed after which the means were compared in a multi-stage process using the One-Sample T-test of Statistical Package for the Social Sciences (SPSS). Tables 4a and 4b present the one sample statistics and one-sample t-test results of the cyber-risks prevalence among secondary school students in Ibadan metropolis.

	N	Mean	Std. Deviation	Std. Error Mean
Contact risk	329	1.7865	.51779	.02855
Internet Dependence	277	1.8091	.49211	.02957
Sexual solicitation	350	1.9336	.91345	.04883
Cyberbullying	308	2.0487	1.00971	.05753
Provocative content	334	2.0156	1.01188	.05537
Imprudent Recharge Risk	296	1.8705	.64142	.03728

Table 4a: One-Sample Statistics of cyber-risk types

As shown in Table 4a, the type of cyber-risk with the highest mean is cyberbullying (mean = 2.0487), followed by provocative content (mean = 2.0156), sexual solicitation (mean = 1.9336), imprudent recharge risk (mean = 1.8705), Internet dependence (mean = 1.8091) and lastly contact risk (mean = 1.7865).

					95% Confidence Interval of the Difference	
	T	Df	Sig. (2-tailed)	Mean Difference	Lower	Upper
	Stage 1: Test Value = 1.78647					
Contact risk	.000	328	1.000	.00000	-.0562	.0562
Internet Dependence	.764	276	.445	.02260	-.0356	.0808
Sexual solicitation	3.013	349	.003	.14710	.0511	.2431
Cyberbullying	4.558	307	.000	.26223	.1490	.3754
Provocative content	4.138	333	.000	.22910	.1202	.3380
Imprudent Recharge Risk	2.254	295	.025	.08403	.0107	.1574
	Stage 2: Test Value = 1.8705					
Sexual solicitation	1.292	349	.197	.06307	-.0330	.1591
Cyberbullying	3.097	307	.002	.17820	.0650	.2914
Provocative content	2.620	333	.009	.14507	.0362	.2540
Imprudent Recharge Risk	.000	295	1.000	.00000	-.0734	.0734
Stage 3: Test Value = 2.0156						
Cyberbullying	.575	307	.565	.03310	-.0801	.1463
Provocative content	.000	333	1.000	-.00003	-.1089	.1089

Table 4b: One-Sample T-test result of cyber-risk types

Table 4b shows the summary of the results of one-sample t-test taken in 3 iterative steps. As shown in the table, Stage 1 shows that there is no significant

difference between the mean value of contact risk and dependency risk, while contact risk is significantly lower than all the other four cyber-risk types (Sexual Solicitation, Cyberbullying, Provocative Content and Imprudent Recharge Risk). Stage 2 shows that there is no significant difference between the mean of Imprudent Recharge Risk and Sexual Solicitation, while Imprudent Recharge Risk is significantly lower than the other two (Cyberbullying and Provocative Contents). The third stage shows that there is no significant difference in the mean of cyberbullying and provocative contents. The result therefore, shows variations in the prevalence of cyber-risk types exposure by secondary school students in Ibadan. Cyberbullying and Provocative Content are the most prevalent cyber-risks followed by Sexual Solicitation and Imprudent Recharge Risk and lastly by Contact Risk and Internet Internet Dependency Risk.

H_{02}: Demographic characteristics (Sex, Age, School Type, Class) of students in selected secondary schools in Ibadan metropolis do not significantly affect their exposure to the different cyber-risk types.

Table 5a presents the mean of each cyber-risk by the sex of respondents while Table 5b presents the result of the Independent Sample T-test.

	SEX	N	Mean	Std. Deviation	Std. Error Mean
Contact risk	Male	135	1.7833	.53931	.04642
	Female	191	1.7880	.50673	.03667
Internet Dependence	Male	116	1.7998	.48823	.04533
	Female	160	1.8111	.49437	.03908
Sexual solicitation	Male	146	2.0360	.93044	.07700
	Female	201	1.8669	.89975	.06346
Cyberbullying	Male	126	2.2222	1.07009	.09533
	Female	179	1.9296	.95008	.07101
Provocative content	Male	146	2.0753	1.10626	.09155
	Female	184	1.9696	.93572	.06898
Imprudent Recharge Risk	Male	124	1.9382	.65762	.05906
	Female	170	1.8196	.62082	.04761

Table 5a: Group Statistics by Sex

	T	Df	Sig. (2-tailed)	Remark
Contact risk	-.079	324	.937	Not significantly different
Internet Dependence	-.188	274	.851	Not significantly different
Sexual solicitation	1.703	345	.089	Not significantly different
Cyberbullying	2.462	248.480	.015	Significantly different
Provocative content	.923	283.873	.357	Not significantly different
Imprudent Recharge Risk	1.577	292	.116	Not significantly different

Table 5b: Summary of gender differences T-test result

Table 5b shows that there is no significant gender diiference in students' exposure to Contact Risk (T= -.079, df = 324, p-value =.937), Internet Dependence Risk (T-.188, df = 274, p-value =.851), Sexual Solicitation Risk (T= 1.703, df = 345, p-value =.089), Provocative Content Risk (T= .923, df = 283.873, p-value = .357) and Imprudent Recharge Risk (T= 1.577, df = 292, p-value = .116). There is however, a significant gender difference in students' exposure to Cyberbullying (T= 2.462, df = 248.480, p-value =.015). As shown in Table 5a, Male students' mean in cyberbullying is 2.2222 while that of female students is 1.9296. Hence, male students' exposure to cyberbullying is higher than that of female students while there are no significant differences in exposure to other risks by male and female students.

Table 6 presents the result of the Analysis of Variance (ANOVA) that tested the age differences in students'exposures to cyber-risks.

		Sum of Squares	df	Mean Square	F	Sig.	Remark
Contact risk	Between Groups	2.191	4	.548	2.054	.087	No significant difference
	Within Groups	85.608	321	.267			
	Total	87.799	325				
Internet Dependence	Between Groups	.166	4	.042	.168	.954	No significant difference
	Within Groups	66.672	270	.247			
	Total	66.838	274				
Sexual solicitation	Between Groups	5.757	4	1.439	1.740	.141	No significant difference
	Within Groups	283.696	343	.827			
	Total	289.452	347				
Cyberbullying	Between Groups	7.418	4	1.854	1.842	.121	No significant difference
	Within Groups	302.044	300	1.007			
	Total	309.462	304				
Provocative content	Between Groups	6.546	4	1.636	1.599	.174	No significant difference
	Within Groups	333.726	326	1.024			
	Total	340.272	330				
Imprudent Recharge Risk	Between Groups	1.178	4	.294	.711	.585	No significant difference
	Within Groups	119.610	289	.414			
	Total	120.788	293				

Table 6: ANOVA of Age Differences in Cyber-risk Exposure

As shown in Table 6, there are no significant differences in students'exposure to each of the cyber-risk type, based on their age groups.

Table 7a presents the mean of each cyber-risk by the type of school attended by respondents while Table 8b presents summary of the result of the independent sample T-test.

	School Type	N	Mean	Std. Deviation	Std. Error Mean
Contact risk	Public	171	1.7982	.52322	.04001
	Private	158	1.7737	.51319	.04083
Internet Dependence	Public	150	1.8148	.50364	.04112
	Private	127	1.8023	.48004	.04260
Sexual solicitation	Public	183	2.0355	.96011	.07097
	Private	167	1.8219	.84828	.06564
Cyberbullying	Public	163	2.2160	1.05619	.08273
	Private	145	1.8607	.92265	.07662
Provocative content	Public	170	2.1047	1.04053	.07980
	Private	164	1.9232	.97588	.07620
Imprudent Recharge Risk	Public	156	1.8825	.65452	.05240
	Private	140	1.8571	.62858	.05312

Table 7a: Group Statistics by School Type

	T	Df	Sig. (2-tailed)	Remark
Contact risk	.428	327	.669	Not significantly different
Internet Dependence	.211	275	.833	Not significantly different
Sexual solicitation	2.210	347.644	.028	Significantly different
Cyberbullying	3.151	305.904	.002	Significantly different
Provocative content	1.643	332	.101	Not significantly different
Imprudent Recharge Risk	.339	294	.735	Not significantly different

Table 7b: Summary of Schol Type Difference Test Result

Table 7b shows that based on the type of school attended by the respondents, there is no significant diiference in their exposure to contact risk (T= .428, df = 327, p-value = .669), Internet Dependence Risk (T= .211, df = 275, p-value =.833), Provocative Content Risk (T= 1.643, df = 332, p-value = .101) and Imprudent Recharge Risk (T= .339, df = 294, p-value = .735). There is however, a significant school type difference in students' exposure to Sexual Solicitation Risk (T= 2.210, df = 347.644, p-value =.028) and also in students' Cyberbullying Risk Exposure (T= 3.151, df = 305.904, p-value =.002). As shown in Table 7a, students who attend public schools report higher exposure to both Sexual Solicitation Risk (mean = 2.0355) and Cyberbullying (mean = 2.2160) than those who attend private schools.

		Sum of Squares	Df	Mean Square	F	Sig.	Remark
Contact risk	Between Groups	3.862	5	.772	2.989	.012	Significant difference(s)
	Within Groups	81.921	317	.258			
	Total	85.784	322				
Internet Dependence	Between Groups	.202	5	.040	.163	.976	No significant difference
	Within Groups	65.977	266	.248			
	Total	66.179	271				
Sexual solicitation	Between Groups	5.915	5	1.183	1.434	.211	No significant difference
	Within Groups	279.653	339	.825			
	Total	285.568	344				
Cyberbullying	Between Groups	8.812	5	1.762	1.733	.127	No significant difference
	Within Groups	301.007	296	1.017			
	Total	309.819	301				
Provocative content	Between Groups	11.378	5	2.276	2.274	.047	Significant difference(s)
	Within Groups	324.285	324	1.001			
	Total	335.663	329				
Imprudent Recharge Risk	Between Groups	.778	5	.156	.374	.866	No significant difference
	Within Groups	118.482	285	.416			
	Total	119.260	290				

Table 8a: Differences (ANOVA Results)in Students' Exposure to Cyber-risks Based on Class

Table 8a shows that based on students'class, there is no significant diiference in their exposure to Internet Dependence Risk (F (5, 266) = .163, p-value =.976),), Sexual Solicitation Risk (F (5,339) = 1.434, p-value =.211), Cyberbullying (F (5, 296) = 1.733, p-value =.127) and Imprudent Recharge Risk (F (5,285) = .374, p-value = .866). There is however, a significant class difference in students' exposure to Contact Risk (F (5,317) = 2.989, p-value = .012 and also in students'

exposure to Provocative Content Risk (F (5,324) = 2.274, p-value = .047). To determine class variations in students' exposure to contact risk and to provocative content risk, Post-Hoc tests were carried out. Results of the Post-Hoc tests are as shown in Table 9b and Table 9c.

		Subset for alpha = 0.05		
CLASS	N	1	2	3
SSS 1	52	1.6587		
JSS 1	65	1.6923		
SSS 2	81	1.7716	1.7716	
JSS 2	72	1.8125	1.8125	
SSS 3	28		1.9375	1.9375
JSS 3	25			2.0500
Sig.		.200	.151	.300

Table 8b: Contact Risk Post-Hoc Test Result

Duncan[a,,b]

As shown in Table 8b, there is no significant difference in contact risk exposure of students in SSS 1, JSS 1, SSS 2 and JSS 2. SSS 3 students' exposure differ significantly (higher) than SS1 and JSS 1 but not significantly different from SS2 and JSS 2. Exposure by JSS 3 students is significantly different (higher) than other classes except SSS 3.

		Subset for alpha = 0.05	
CLASS	N	1	2
JSS 3	26	1.7154	
SSS 2	79	1.7620	1.7620
JSS 2	68	2.0176	2.0176
SSS 1	53	2.1660	2.1660
SSS 3	30	2.1667	2.1667
JSS 1	74		2.1838
Sig.		.054	.073

Table 8c: Provocative Content Risk Post-Hoc Test Result

Duncan[a,,b]

There is a significant difference between JSS 3 and JSS 1 students' exposure to provocative content, with JSS 3 students being significantly lower than JSS1 students' exposure. There are no significant differences among all other classes.

H_{03}: There are no significant relationships among students' levels of exposure to different cyber-risk types (Internet Addiction, contact risk, sexual solicitation, provocative content, cyberbullying, improper data possession)

A correlation matrix showing the results of the analysis testing the relationships among cyber-risk types is as presented in Table 9.

		Contact risk	Internet Dependence	Sexual solicitation	Cyberbullying	Provocative content	Imprudent Recharge Risk
Contact risk	Pearson Correlation	1	-.006	-.103	-.030	-.082	-.130*
	Sig. (2-tailed)		.932	.076	.628	.173	.035
	N	329	239	298	267	278	265
Internet Dependence	Pearson Correlation		1	.486**	.567**	.556**	.716**
	Sig. (2-tailed)			.000	.000	.000	.000
	N		277	275	256	246	269
Sexual solicitation	Pearson Correlation			1	.805**	.704**	.504**
	Sig. (2-tailed)				.000	.000	.000
	N			350	294	307	294
Cyberbullying	Pearson Correlation				1	.725**	.568**
	Sig. (2-tailed)					.000	.000
	N				308	285	270
Provocative content	Pearson Correlation					1	.540**
	Sig. (2-tailed)						.000
	N					334	258
Imprudent Recharge Risk	Pearson Correlation						1
	Sig. (2-tailed)						
	N						296

Table 9: Correlation Matrix of cyber-risk types

As shown in Table 9, there are high, positive and significant relationships among Internet Dependence Risk, Sexual Solicitation Risk, Cyberbullying, Provocative Risk and Imprudent Recharge Risk with correlation coefficient (r) ranging between 0.486 and 0.805 and p-value being 0.000 all through. Contact Risk has no significant relationship with any other cyber-risk type except Imprudent Recharge Risk while there is a low, negative but significant relationship between Contact Risk and Imprudent Recharge Risk (r= -.130, p-value = 0.035).

DISCUSSION OF FINDINGS AND CONCLUSION

Discussion of Findings

Students' Levels and Purposes of Internet Usage

Students started using the Internet quite early with majority of them starting to use the Iternet between the age of 10 and 12 years, followed by those who started using the Internet between 7 and 9 years old. The students spend more time on the Internet during their normal non-school days (every day or almost every day) than during their normal school days, once or twice in a week. The most prominent purposes of using the Internet are first for schoolwork, followed by for posting photo, video, music to share with others, to download music or films, to watch news on the Internet and to watch video clips. It could therefore, be specified that secondary school students in our study use the Internet mostly for academic, communication, entertainment and information sharing purposes.

This finding is similar to that of Fleming et al. (2006), who reported that the top six main reasons cited for using the Internet by Australian 13 to 16 year-olds, were for researching for homework tasks, talking to friends via instant messaging, downloading and/or playing games, talking to friends via e-mail, downloading and playing favorite songs and videos, and getting information about favorite TV shows and movies. Although there are many other purposes that the students have not been very much involved in using the Internet for, most of which are creative purposes like creating contents on blogs or website, the study shows that secondary school students in our study are regular users of the Internet. Also, their purposes of using the Internet are valuable to their development.

Students' Levels of Exposure to Cyber-Risk Behaviours

A sizeable percentage of students have been exposed to each of the cyber-risk type. The most prevalent contact risk exercised by students is looking for new friends on the Internet, followed by adding people to their friends list or address book that they have never met face to face. Just above thirty percent of the students have sent personal information, photo or video of themselves to someone that they have never met face to face. Among Internet dependence risk behaviours, most prominent is students' experience of trying unsuccessfully to spend less time on the Internet, this is followed by those who have engaged in thinking about what is happening on the Internet when they are not using it and then students perceiving they have spent less time than they should with either family or friends. Just about fifty percent of the students have also gone without eating or sleeping because of the Internet, felt an anticipation before using the Internet, and caught themselves surfing when they were not really interested. About the same percentage have also felt bothered when they could not be on the Internet. Just above forty percent of the students have experienced a feel of guilt or depression after using the Internet for a long time, as well as a feel of strong necessity to go onto the Internet when they are not online. The most prominent sexual solicitation risk experienced by students is seeing images or video of someone naked on the Internet, this is followed by those who have ever seen a sexual message posted where other people could see it on the Internet, and this category is followed by those who have ever seen images or video of someone having sex. A little above forty percent of the students have been asked to talk about sexual acts with someone on the Internet.

The most prevalent cyber bullying experienced by students is being left out or excluded from a group or activity on the Internet, followed by seeing nasty or hurtful things on the Internet, nasty or hurtful messages about them being passed around or posted where others could see it. Just above forty percent have had nasty or hurtful messages sent to them while some, about thirty five percent have ever been threatened on the Internet. Just below fifty percent of the students have seen hate messages that attack certain groups or individuals, followed by seeing content on taking drugs, and on ways of committing suicide amongst other provocative contents. More than fifty percent of the students have ever bought data with money meant for something else so as to access the Internet, bought data on credit from their GSM operators so as to use the Internet, and out rightly discontinued the use of a SIM card because of their inability to pay back for borrowed credit that they used for Internet access.

This finding corroborates the fact that Cyber-risks are a common phenomenon and the children are not left out in their capacity, majorly as recipients, and sometimes as participants or actors as stated by Gasser et al. (2010). It also

supports the findings of Ogunfunwa (2018) and Ajanaku (2018) who reported substantial percentages on students' exposure to cyber-risk behaviours in Lagos State, Nigeria.

Students' Sources of Advice on How to Use the Internet Safely

Parents, teachers and the media (television, radio, newspapers and magazine are the most prominent sources of Internet safety information for secondary school students in our study. This finding is not unexpected because these are the closest sources to these students. The challenge however, is the level of quality of information received by these students, being digital natives, and who generally appear to be more savvy than the older generation of parents and teachers who are mostly available to advise them on their safety on the Internet.

Comparison of the Degrees of Exposure of Secondary School Students in Ibadan Metropolis to Cyber-Risk Types

The most prominent cyber-risk types experienced by students are cyberbullying and provocative content. These are followed by exposure to sexual solicitation and Imprudent Recharge Risk and lastly by Contact Risk and Internet Dependency risk. This finding corroborates those of Ogunfunwa (2018) and Ajanaku (2018) who reported that the most prevalent cyber-risk among Nigerian eight to twelve years was victimisation by cyberbullying followed by exposure to inappropriate content (Ogunfunwa, 2018, Ajanaku, 2018).

Effect of Demographic Factors (Sex, Age, School Type And Class) on Students' Exposure to Different Cyber-Risk Types

Gender, School Type and Class were found to affect students' levels of exposure to some of the cyber-risk types. Gender affects students' level of exposure to cyberbullying, with male students' exposure to cyberbullying being greater than that of female students. This is in line with the findings of Fleming et al. (2006) who reported higher exposure to inappropriate materials and behaviors online by boys than girls. School type affects exposure to sexual solicitation and cyber bullying risks with students who attend public schools having significantly higher exposure to both risk types. Lastly, students' class has effect on contact risk and exposure to provocative contents; JSS 3 and SSS 3 students report the highest contact risk exposure, SSS 1 and JSS 1 students report the least exposure to contact risk while JSS 2 and SSS 2 students are in between the two extremes. However While JSS 3 students reported the least exposure to provocative contents risk type, JSS 1 students reported the highest exposure to the same risk. The finding shows that students in JSS 3 are more vulnerable considering their degree of exposure to cyber-risk despite their level of maturity.

Relationships among Cyber-Risk Types

Apart from contact risk, there are high, positive and significant relationships among all cyber-risk types. There is however, a low, negative but significant relationship between contact risk and Imprudent Recharge Risk. This implies that students'exposure to a risk type can positively influence exposure to another risk type. This is similar to the finding of Gámez-Guadix, Borrajo, and Almendros (2016) who reported that adolescent problematic Internet use can increase the perpetration of cyberbullying and meeting strangers online while meeting strangers online can also increase the likelihood of cyberbullying perpetration.

Conclusion

From the findings of the present study, it can be concluded that students in selected secondary schools in Ibadan metropolis are regular users of the Internet. Majority begin to use the Internet at the of 10 to 12 years. They mostly use the Internet once or twice in a week during normal school periods and everyday or almost everyday during normal non-school periods. The most prominent purpose of using the Internet is for school work followed by entertainment, communication and information sharing. There is a considerable exposure to different cyber-risk behaviours. The most prominent cyber-risk type experienced by students is cyberbullying and provocative content followed by sexual solicitation and Imprudent recharge risk and lastly Internet dependence and contact risk. Male students are significantly more prone to cyberbullying than female students. Public school students are more prone to cyberbullying and sexual solicitation risks. Apart from contact risk, there are high, positive and significant relationships among all cyber-risk types while a low, negative but significant relationship exists between contact risk and imprudent recharge risk.

Recommendations

Based on the findings of this study, the following recommendation are made:

1. Information Technology professionals, educators and other stakeholders who are highly skilled in Internet use and safety should get intentionally involved in enlightening students on the importance and means of ensuring safety while they use the Internet.
2. Information Technology content providers and educators should create engaging online content in a graphic novel style which can be used to educate students on how to be responsible digital citizens.
3. Information Technology professionals, educators and other stakeholders who are highly skilled in Internet use and safety should get intentionally

involved in educating students' prominent sources of Internet safety information on effective Internet safety skills and techniques.

4. Information Technology professionals, educators and other stakeholders who are highly skilled in Internet use and safety should provide means of attending to public school students in Ibadan, Oyo state on their Internet safety needs in order to address the gap in safety between them and their private school counterparts.
5. Information Technology professionals, educators and other stakeholders who are highly skilled in Internet use should provide means of developing students'capacity in creative skills such as writing blogs or online diaries, creating a character, pet or avatar, using webcam and posting messages on website.

Suggestions for Further Studies

The main objective of the present study is to assess the levels of Internet usage and cyber-risk exposure by students in selected secondary schools in Ibadan Metropolis, Oyo State, Nigeria. The findings have however, necessitated a need for further studies in order to provide answers to some further questions emanating from the present study. We hereby provide the following suggestions for further studies:

1. What factors are responsible for public school students scoring higher than private school students in their levels of exposure to sexual solicitation and cyberbullying risks.
2. What factors make male students score higher than private school students in their levels of exposure to cyberbullying.
3. What is it about Junior Secondary School Three (JSS3) and Senior Secondary School Three (SSS 3) students that make them to be highly scored in their exposure to contact risk than students in other classes.
4. An asssessment of the level of effectiveness of Internet safety information received by students from their different sources of information on Internet safety.
5. Assessments of Internet use and cyber-risk exposure of students in some other local government areas in Oyo state.
6. Assessments of Internet use and cyber-risk exposure of students in other Nigerian states.

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