**Review Article**

**Internet Use Addiction: Health Consequences and Prevention among University Undergraduates in Nigeria**

**Abstract**

The global widespread of the acceptance and usage of internet and its associated technologies has become a critical part of modern-day life, especially among undergraduates in Nigerian universities, whereas excessive and uncontrolled use of the internet popularly known as internet addiction negatively affects everyday health life, internet addiction if not deliberately put on check will become a full-blown global health concern of the 21st Century. Thus, this study was carried out to investigate the health consequences of internet addiction and its possible preventive measures among undergraduates in Nigerian universities. The study employed description and critical analysis of existing data and literature searches using Google scholar and Hinari electronic database as the methodology; a systematic review of the existing studies on internet usage and addiction, its underlining health consequences and possible prevention among undergraduates in Nigeria was carried out. This study found that factors that influence internet addiction among undergraduates include peer influence, family and demographic characteristics. Also, there are associated health consequences of internet usage addiction which includes physical, mental and social. Recommendations for possible prevention were highlighted in the paper.

**Keywords:** Internet use addiction, Health consequences, prevention**,** Systematic review, Nigeria undergraduates.

**1. Introduction**

Advancement in Digital Technologies has a great benefit on the everyday lives of almost all the people in the world. The Internet is one of the products of technological advancement. The Internet serves as a link between two or more people and it can connect a large number of people throughout the world. The internet makes communication and interaction fast, quick, and very easy. Goodwill Community Foundation (2013) saw the internet as the physical network that connects people around the world and a network is a group of more than one computer system linked together. Ogbomo and Ivwighreghweta (2016) describe the internet as a worldwide interrelation of computers that permits people to send and receive various types of information including video, text, voice, graphics, and other computer programmes. It connects the globe so jointly through its positive aspects such as conducting research, performing business transactions and communications, accessing library information resources, communicating with social relations, etc. Akanbi, Sulaiman, and Adeyemi (2018) believed that the internet serves as an avenue to promote group and collective discussion, which is time and distance free among students of higher schools of learning. The group or collective discussion can take place in the form of video conferencing, chat room, and so on.

The Internet has so many advantages which are not limited to e-mailing, passing of information, unrestricted and timely availability, online chat services, e-commerce, entertainment, downloading of materials, software downloading and so on. It has helped the general populace including university students in meeting their academic-related needs, helping them to communicate, search for new knowledge, share information and ideas, download lecture notes, and also enables one to perform many other routine activities like purchasing tickets, ordering books, banking, audio and video calling and other entertainment activities (Raveendran, Jose, Jacob, George, Vinayak, Mubashir, Greeshma, Unni and Aswani, 2021).

Undergraduates are categories of students who are in the university studying a particular course or the other to obtain a bachelor's degree. The undergraduates gained entrance to the university after the completion of their senior secondary school in Nigeria to study for four to six years courses depending on their courses. Sometimes, some of them may study for three to four years if they have had colleges of education and polytechnic certificates in related fields. These Undergraduates make use of the internet in their day-to-day activities. Bolu-Steve, Oyeyemi, and Amali, (2015) noted that Nigerian undergraduates use the internet majorly for doing their assignments and communication.

Studies have noted that university students spent an average of four hours per session on the internet to do one thing or the other and apart from academic work, university students predominantly use the internet for gaming, pornography, and entertainment purposes, this could be categorized as excessive and uncontrolled use of the internet (Zewde, Tolossa, Tiruneh, Azanaw, Yitbarek, Admasu, Ayehu, Amare, Abebe, Muche, Fentie, Zemene and Melaku, 2022; Adiele and Olatokun, 2014). Thus, this study investigates the health consequences of internet addiction and its possible preventive measures among undergraduate students in Nigerian universities.

**2. Objectives**

This research work is being carried out to investigate the health consequences of internet addiction among undergraduates in Nigerian universities.

The specific objectives are, to:

1. find out the purpose of internet usage among undergraduates in Nigerian universities;
2. examine the level of internet addiction among undergraduates in Nigerian universities;
3. determine the factors influencing internet addiction among undergraduates in Nigerian universities;
4. identify the health consequences of internet addiction among undergraduates in Nigerian universities;
5. identify the preventive measures toward internet addiction among undergraduates in Nigerian universities.

**3. Methodology**

The methodology for this study was description and critical analysis of existing data and literature. The literature search was done using appropriate keywords in an advanced search of Google scholar and the Hinari database. Systematic searches of all electronic databases were conducted from October 2023 to December 2024.

**4. Literature Review**

This literature review highlights existing research on the health consequences that is associated with excessive internet use, which has led to addiction among undergraduate students in Nigeria. It also explores some prominent factors influencing internet addiction, the health implications of addictive internet use and possible preventive behaviours as measures among undergraduates in Nigerian universities.

**4.1 Internet Use among Undergraduates in Nigerian Universities**

The use of the internet is becoming increasingly evident in the everyday experience especially among undergraduates in Nigerian universities. This may not be unconnected from the fact that it could be accessed through the use of laptops, desktops, handheld and mobile phones, tablets, and all forms of mobile devices. There is a wide range of use of the internet throughout the world in recent times. Many university students spend a whole lot of time using the internet for varying degrees of activities. Studies have shown that undergraduates spend most of their active hours of the day on the internet watching movies, listening to music, reading, sourcing materials, and playing online games, consequently leaving behind several other important aspects of their life unattended. For instance, Mboya, Leyaro, Kongo, Mkombe, Kyando and George (2020) noted that 40.2% of their respondents spent five hours on the internet per day and 44.5% of them used the internet visiting social networking sites. Also, Raveendran, et al (2021) observed that 215 (94.7%) of the students in their study spent an average of 35 minutes for academic-related purposes, while 134 (59%) spent an average of 97 minutes for non-academic purposes, and 143 (71.5%) students spent more than 2 hours on social networking sites, social issues, personal issues and reading and sharing of jokes on the internet.

Moreover, the use of the internet among university students is visibly increasing over time coupled with the advent of internet-enabled smart devices such as Watches, Televisions, and so on. For instance, in 2008, a study by Awoleye, Siyanbola and Oladipo discovered that 272 (40%) students in their study used the internet on weekly basis, while 38.8% use it every month and 4% rarely used it; they used it only once in a year. Olatokun (2008) also stated in a study that 47% of the respondents used the Internet on a daily basis, 47.9% of the respondents used it weekly, 23.8% use it monthly, while 7.7% indicated using the internet rarely. As of 2016, a study by Ogungbeni, Adekanye, Bamigbose and Sulaiman discovered more students were using the internet. Their study discovered that 75.3% of them use the internet every day, 19.6% of the respondents use the internet two days per week and only 3.1% do not access the internet at all. Also, in 2019, the number of people using the internet increased. A study of internet usage among students by Ajanaku (2019) showed that 76% of the respondents make use of the internet every day, 19.33% weekly and 14.67% on monthly basis. Research by Alotaibi, Fox, Coman, Ratan and Hosseinzadeh (2022) as well discovered that students access the internet, especially through their Smartphones and other mobile devices between six to eleven hours (6-11 hours) every day.

Undergraduates in Nigeria make use of the internet for several purposes and through different means. Almarabeh, Majdalawi and Mohammad, (2016) discovered in their study that 97.95% of the undergraduate respondents use the internet for visiting social networking websites such as Facebook, Twitter, and Instagram, 90% used it for chatting with friends using Messenger, 91.98% used it for studying, information gathering, and searching, 85.45% use it for watching or downloading songs and videos, 84.51% used it for reading news, 78.92% used the internet for E-mailing, 63.99% for playing games and 36.38% use the internet for buying products online.

Alabi (2013) discovered that Nigerian Undergraduates use the internet through Facebook to meet new people, have entertainment, social events, chat, maintain relationships, do media creation and schoolwork. A study by Ogbomo and Ivwighreghweta (2016) revealed that Nigeria undergraduates use the internet to search for Information (55.6%), social media sites usage (45,5%), instant messaging and group discussion (25.5%), online shopping (16.3%), online dating (13,2%) and online gambling (9.7%). Fagbola, Olajide and Ahmad, (2022) found out that undergraduates in Nigeria use the internet through a social network such as Facebook (80%), WhatsApp (73.6%), Wechat (21.4%), Instagram (75%), Twitter (88.2%), Tumblr (13.6%), LinkedIn (13.6%), Qzone (15.5%), Google+ (3.6%), Pinterest (7.7%), MySpace (13.2%), Snapchat (1.4%), Flickr (15.9%), Skype (14.5%), YouTube (89.1%) and for communication, research and academic purpose, interpersonal relationship, to be informed, updated and relevant, kill boredom and relieve stress, keep in touch with friends and loved ones, keep update and attractive profile, find and unite with old friends, organise discussion forums and pages.

**4.2 Internet Use Addiction among Undergraduates in Nigerian Universities**

Advantages derived from the use of the Internet by Nigerian undergraduates cannot be overemphasized especially in the 21st-century livelihood. However, the controversial issue of being negatively addicted to the Internet due to its excessive and uncontrolled usage has constituted a modern-day public health concern. When there is no control as regards the use of a thing and usage is in excess, it leads to addiction. Internet addiction is the use of the Internet without caution or control; it is an excessive use that can lead to negative consequences for the users.

Young (1996) described internet addiction as staying online for pleasure for about 38 hours or more per week, especially in online chat rooms. Also, Young and Rogers (1998) further defined internet addiction as the inability of a person or people to control his or her use of the internet which may lead to difficulty in a person's psychological, social, school, and or work life. Ogbomo and Ivwighreghweta (2016) stated that students may demonstrate internet addiction behaviour in many ways such as losing track of time while using the internet, severe engrossment with the internet without being mindful of it and too much time spent on it, becoming annoyed if disturbed while online, decreased social interconnection with other important people and areas of life, feeling that the world outside of the internet is boring and isolation from friends and family.

Haque, Rahman, Majumder, Haque, Kamal, Islam, Haque, Rahman and Alattraqchi (2016) noted that almost all the participants in their study were suffering from mild internet addiction symptoms and further noted that the characteristics of learners that is addicted to the internet are frequently staying online longer than they intended or always online longer than planned, occasionally neglecting household chores to spend more time online, checking emails before doing anything else that is needed to be done, had academic performance or productivity suffer because of the Internet, becoming defensive or secretive when anyone asked what they were doing online, blocked out disturbing thoughts about life with soothing thoughts of the Internet, found oneself anticipating when next they would go online again, feared that life will be empty, boring and meaningless without the Internet and tried to cut down the amount of time spent online but failed. Furthermore, the majority of their respondents were affected by the internet addiction characteristics. Olawade, Olorunfemi, Wada, Afolalu and Enahoro (2020) stated that 45% of their respondents were normal internet users, while 42% were mildly addicted to the internet and 13% were moderately addicted to the internet. Also, a study by Lebni, Toghroli, Abbas, NeJhaddadgar, Salahshoor, Mansourian, Gilan, Kianipour, Chaboksavar, Azizi and Ziapour, (2020) discovered that 45.5% of their respondents were internet addicted both male (23%) and female (22.5%). Omoyemiju and Popoola (2021) discovered in their study that 77 (5.3%) of their participants showed normal characteristics of internet usage, 726 (50.1%) showed a low level of internet addiction, while 441 (30.5%) of the study participants demonstrated a high level of internet addiction and 204 (14.1%) exhibited a severe level of internet addiction.

Adiele and Olatokun, (2014) and Ojeniyi (2015) discovered from their study that males are addicted to pleasure seeking by seeking and searching for sex-oriented and exclusive materials, while the female internet addict uses the internet for personal pleasure such as downloading activity when online. Moreover, Fagbola, Olajide and Ahmad, (2022) reported that Nigeria undergraduates are addicted to social networks such as YouTube (89.1%), Twitter (88.2%) Facebook (80%), Instagram (75%), and WhatsApp (73.6%) and what they were addicted to doing are for communication (99.1%), staying in touch with friends and loved ones (97.7%), to kill boredom and relieve stress (95.4%), to be informed, updated and relevant (93.6%), research and academic purpose (90.9%), to find and reunite with old friends (84.1%), to keep an updated and attractive profile (83.2%), interpersonal relationship (81.8%) and to organize discussion forums pages (15.5%).

**4.3 Factors influencing Internet Use Addiction among Undergraduates in Nigerian Universities**

There are a series of factors influencing, promoting and aiding internet addiction, especially among university students in Nigeria. Nadhirah, Normala, Lukman, Azlini and Kamal, (2018) classified such factors as internet activities, family factors such as parental guidance, single parenthood e.t.c. and peer influence. Also, Miao, Jiang, Wang, Li, Wang and Zeng (2018) discovered that a lot of factors contribute to internet use addiction among students which were not limited to academic pressure, poor academic performance, a negative relationship between teachers and students, having classmates or peers with problematic internet use, and parental neglect, e.t.c. Sulki, Jaekyoung and Hae (2019) noted that factors influencing internet addiction among students lie with the parent, the school, the environment (accessibility to internet cafés, exposure to internet games), and internet characteristics or activities.

**I.** **Internet Activities:**Internet activities include those events that happened and are showcased on the internet and most of which attract individuals and make them glued to the use of the internet. Learners used the internet for a series of actions such as sourcing learning resources, communication, social networking, watching films, gaming, cybersex, gambling, e.t.c. Massoud and Uyanga (2013) in their study noted that entertainment content and activities are major factors that makes students get so addicted to the internet. Haque et al (2016) discovered in their study that their study respondent uses the internet for reasons like social networking (56.2%), entertainment (39.7%), education (34.9%), research (12.3%), and E-mail communication (12.3%). Also, Miao, et al (2018) ranked social networking, schoolwork, entertainment, gaming and shopping as the top five online activities among other activities that made students in their study got addicted to the internet. Quaglio and Millar (2020) further noted that gaming addiction or gaming disorder is the problematic online behaviour that has the largest evidence base across all addictions related to internet use among students.

**II. Family factors:**Family has a lot to do with the behavioural development of any student.Lack of parental guidance and single parenthood could have a serious negative influence on the development of children. Every parent is expected to define healthy ways and styles of guiding their children during the developmental stage of their children. Some parents do not tend to be concerned about what their children watch on the internet, while some are very inquisitive to know what they watch. Some even try as much as possible to monitor and regulate how, when and what the internet is used for by their children. Too much freedom given by some parents has led to internet addiction in their children. Omoyemiju and Popoola (2020) observed that in Nigeria, many undergraduates enjoy and experience the freedom to think or act without being constrained by parents or guidance; this is largely dependent on the parenting styles adopted in homes by those parents. Also, in some homes and climes, children are allowed and given the freedom to do whatever pleases them with little or no control or regulation by their parents or guidance on their daily activities on the internet. Nadhirah, et al (2018) noted that parents are expected to play a positive role in controlling the way the internet is used by their children thereby encouraging and forming a positive attitude which may as well control their moral conduct in activities relating to internet usage when such children are grown.

Furthermore, a study by Xiaoli, Hong, Silu and Zhengwen (2009) revealed that students being raised by a single-parent family were more likely to become addicted to the internet; this is because there may be a high dependency on excessive internet and other electronic media use which is associated with a lack of interpersonal relationship with their parents. The study by Xianhua, Xinguang, Juan, Heng, Jianghong, Liesl and Hanrong (2013) confirmed that poor parental relationship makes parents not spend quality time with their children thereby making the children feel that their parents do not understand them and therefore do not disclose their problems to their parents, but rather sought for the solution from the internet which increases the rate of internet addiction among students.

 Miao, at al (2018) noted that being internet addicted by students is associated with factors such as the unhealthy relationship between the parents, mother's inconsistent parenting styles, mothers' neglect and a lack of parental monitoring. They further noted that an unhappy atmosphere at home is an influential factor to internet addiction among students because many of the students in the circumstances tend to seek alternative ways of deriving their joy and satisfaction from the use of the internet and consequently get addicted to it.

Similarly, Safiah, Norliah, Siti, Massila, Mahadi and Shahrulanuar, (2016) stated that socio-economic factors have a positive relationship with internet use addiction because students from home with high income may have more access to computer sets and more sophisticated Smartphones that may give them more access opportunities to the internet. Also, Zewde, et al (2022) noted that students from wealthy homes may be addicted to the internet because of the likely availability of internet access at home and even have enough money to subscribe to the internet.

**III. Peer influence:**Peer influence is a great factor when it comes to internet usage most especially among university students in Nigeria. Many students, in order to meet up with the current trends of issues as discussed or displayed on the internet by their peer groups and friends, may eventually be addicted to the internet. Students tend to imitate the different lifestyles of their friends. Internet surfing and browsing is one of the common and regular activities engaged by most students in different university campuses in Nigeria and thus its usage could be taught and learned between friends and peer groups. Massoud and Uyanga (2013) in their study noted that as a result of making online friends and spending time with friends on the internet, peers are influenced by others to make online friends and spend more valuable time chatting on the internet with friends thereby becoming addicted to the internet. Miao, et al (2018) stated that having peers who displayed addictive internet use behaviour is associated with an increased likelihood of internet addiction since children and adolescents are in a sensitive stage in which peer relationships are paramount and they may want to get acceptance or be accepted by their peers. Therefore, some of the students ended up imitating their peer's behaviour including internet addiction. Sulki, Jaekyoung and Hae (2019) also confirmed that peer relationship and friendship influence internet addiction among students. Fagbola, Olajide and Ahmad (2022) stated that undergraduates in Nigeria get addicted to the internet in order to yield to peer pressure and for comparisms sake.

**IV.** **Demographic characteristics (age and gender):** Age has been found to have a significant influence on internet usage addiction among students in tertiary institutions of learning. Omoyemiju and Popoola, (2021) stated that Nigerian undergraduates are within the age range of 13-25year. Safiah, et al (2016) noted that the age range of students in tertiary institutions have a high tendency of getting addicted to internet use as compared to the working class and this may be a result of time availability to them. Also, Akanbi, Sulaiman and Adeyemi (2018) discovered in a study among Nigerian undergraduates that students between the ages of 16-22years are so obsessed with the use of the internet.

Gender also contributes to internet use addiction. Omoyemiju and Popoola, (2021) discovered in a study among Nigerian undergraduates that males are more addicted to internet use than their female counterparts. Adiele and Olatokun (2014) reported in their study that male respondents were almost thrice the number of the female among the severe internet addicts. Safiah, et al (2016) stated that the male gender has high tendency to become internet addicted than females. Zewde, et al (2022) also noted that males predominantly are internet addicted than their female counterparts.

**V.** **Psychological Variables:**Psychological factorssuch as stress, loneliness, and anxiety have been found to have a positive relationship with internet use and addiction among university students. For example, Massoud and Uyanga (2013) discovered that stress and loneliness have an independent positive influence on internet use addiction among students. Safiah, et al (2016) also noted that students with some psychological disorders may get addicted to internet use. Moreover, Fagbola, Olajide and Ahmad (2022) stated that undergraduates in Nigeria get addicted to the internet as a result of anxiety, hostile/aggressive behaviour, impulsivity, shyness, low self-esteem and dissocial personality traits.

**4.4 Health Consequences of Internet Addiction among Undergraduates in Nigerian Universities**

The health consequences of internet addiction cannot be overemphasized. Internet addiction could lead to severe health challenges ranging from physical to psychological or emotional to mental and social health. It can also have an effect on individual standards of living thereby leading to poverty in the family. Young (1998) noted that internet addiction can scatter or destroy families, relationships and careers. Ogbomo and Ivwighreghweta (2016) noted that persistent and unnecessarily extended periods spent on the internet are associated with psychological and sociological health problems among university students.

 Quaglio and Millar (2020) stated that the inability to have control over one's internet consumption is an addiction that may lead to a decrease in physical and psychological wellbeing, with some of the signs and symptoms like social withdrawal from others, getting angry easily, distress, loss of control, conflicts and others, pushing people towards isolation. They also noted that children’s cognitive development can be damaged by prolonged internet use for whatever purpose. Some of the specific health consequences of internet addiction are as follows:

**I. Internet addiction and physical health:**Physical health of an individual is important in achieving optimum health. If students are addicted to the internet, it may lead to impairment of physical health.The physical health consequences also include thrombo-embolism, musculoskeletal impairment, visual and hearing impairment and metabolic problems (Mboya et al, 2020). Taha, Shehzad, Alamro and Wadi (2019) reported that individual that is addicted to the internet may experience physiological health problems such as headaches, backache, weight gain and neck pain. In a study by Hagrass and ELSayed (2021), it was stated that their respondents made physical complaints such as dizziness, dry eyes, wrist pain and stomachache as a result of an unnecessarily prolonged time spent on the internet, which had resulted in being addicted to the internet. Alotaibi, et al (2022) noted that people who are addicted to the internet, especially with the use of Smartphones, are more likely to have poor physiological health, this could include becoming overweight or obese, having pain in their shoulder, eyes, neck and back compared to non-addicted people.

**II. Internet addiction and mental/psychological health:**Internet addiction could lead to poor mental health; this is because mental health is concerned with individual feelings, thinking and reactions when it comes to the life situation in general. Jahanian and Seifury (2013) stated that internet addiction could lead to decline in the mental health of students. Ali, Kalsoom, Kazmi, Munir, Qayyum, Akhter and Jan (2019) noted that students were facing serious mental problems due to internet addiction which reflects in depression, anger, sleeplessness, and decreased ability to concentrate in school. Miao, et al (2018) discovered that students who use social networking platforms and sites more often than normal and displayed severe internet use addiction and also experience a high level of psychosocial distress. Sulki, Jaekyoung and Hae (2019) stated that psychological behaviour displayed by students addicted to the usage of the internet is often characterized by higher impulsivity, depression and aggressiveness.

In a related study by Lebni, et al (2020), it was revealed that half of the students in the study had poor mental health which includes depression, anxiety, somatic symptoms and insomnia as a result of internet addiction. Also, Mboya, et al (2020) noted that students with internet addiction problems face challenges such as inadequate self-care, difficulty in performing daily routine, pain and discomfort, anxiety and depression. Ekechukwu and Isukwem (2020) discovered that anxiety has a strong relationship with internet use among Undergraduates in Nigeria. Moreover, Aly-baghdady, Shahin, Mohamed and Abd Elrahman (2021) stated in their study that psychological symptoms such as fear, frustration, anxiety, depression, withdrawal and negative energy were the highest symptoms being experienced among their study participants who were addicted to the internet.

**III. Internet Addiction and Social Health:** Internet addiction can lead to the loss of precious relationships and consequently make them socially unfit. Misuse of the internet which could result in addiction can lead to low quality of social interaction and could result in isolation, loneliness and depression. Although the internet is supposed to be used for social interaction among students, but unfortunately, as a result of its over-dependency on it among students, it has led to social isolation which later led to depression. Akanbi, Sulaiman and Adeyemi (2018) discovered that internet addiction had a great impact on the psychosocial health of undergraduates in Nigeria because they find it difficult to interact with others in real life and lead to social isolation as a result of too much use of the internet. Lebni, et al (2020) stated that the uncontrolled use of the internet may serve as a substitute for living without vitality and that loneliness and isolation may consequently cause people to spend more time on the internet, thereby decreasing the quality of their social relationships with others in the society. Many students prefer to use the internet as a way out of problems rather than interact and associate or go out with other people for social activities.

**4.5 Prevention of Internet Addiction among Undergraduates in Nigerian Universities**

Internet addiction among Nigerian undergraduates can be prevented in many ways. Meanwhile, multiple approaches should be employed while preventing internet addiction among students. Below are some of the preventive measures which can come in the form of policy as suggested by Quaglio and Millar (2020);

**I. Prevention through health promotion including reducing the risk and the harm**

Educational programmes and campaigns with a preventive approach against internet addiction could go a long way in reaching large people and can be implemented with intervention. These programmes may be designed to prevent the occurrence, i.e. prevention before the onset of the addiction, to reduce incidence and prevalence and also to reduce the impact it may have on students. This programme-based approach to the intervention may involve the schools, parents, community members and other stakeholders such as governmental and non-governmental organisations. This approach may include:

**a) Initiation of information and prevention campaigns:**Information campaigns that could help to create awareness about the negative health implication of internet addiction and at the same time help to develop skill sets that may eventually lead to the prevention of addiction among students.

**b) Increase in education regarding harmful internet use and its consequences:**Students should be educated on the technical aspect of the internet, digital literacy, and social consequences of internet addiction and on how internet use can benefit them and how addiction can cause harm to the individuals and the society. Self-awareness on internet use can be taught which will help to develop skills and practices for good internet use. This can eventually reduce the likely harm to an individual’s well-being and harm to other people as a result of internet addiction. University management and authority could as well make policies on the healthful use of Smartphones among students.

**c) Stimulation of schools to develop policies that protect learners against harmful usage related to internet use:**Internet-related activities may be reduced in order to reduce being addicted to it by students. Students may be encouraged to use the school library and the hard copies of materials available to them.

**II.** **Provision of support services**

**a) Provision of health and social services support for internet users that engage in unhealthy and harmful use:**Proactive intervention could be provided by the governmental and non-governmental organizations to assist the health and social services, provide support and deal with internet addiction properly.

**b) Support of the family and the community:**Educational, social and clinical support could address individuals and people on internet use such as parents, siblings, partners, friends, peers, etc. Family members, friends, clubs, and communities where people operate could play a role in discouraging harmful internet use. Policies can target these stakeholders and motivate them to take effective action to discourage harmful and unhealthy internet use that can lead to internet addiction.

**III. Governmental actions at local, state and national levels:** This could include the establishment of governmental units to address the consequential health problems of harmful and unhealthy internet usage.There should be policy interventions at different levels of government to prevent internet addiction among students of different categories.

**IV. Protection offered by media technology industries**

**a) Promoting technology that protects internet users against addiction:**This policy option requires technology companies to introduce design features, products and services, as well as corresponding user policies that enable internet users to avoid usage patterns that cause harm to their health and wellbeing. In other words, the industry should modify products and services so that the harmful effects to users are reduced or eliminated, whilst sometimes it also means introducing new products and services that enable users to protect themselves. The technology industry could design products in such a way that there will be measures to internet usage in a day and notify the users when they have exceeded the normal time of usage per day. This will help in reducing and discouraging internet addictive behaviour. There should be features that allow for particular functions of Smartphones and tablets to be automatically switched off at certain times or at certain locations.

**b) Promoting technology that better protects social institutions and social inclusion:**This policy option encourages technology companies to introduce products and services that better protect social institutions, equality and social inclusion.

**V.** **Prevention through** **Research**: More research efforts need to be promoted on the positive and negative effects of internet usage and effective interventions on internet addiction among students. A lot of research is still needed on the aspect of learners’ internet addiction as it will lead to appropriate intervention programmes for each level of students. When the results of the research are appropriately planned, implemented and follow-through, they can as well lead to a reduction in internet addiction among students at different levels of education.

In addition, Fagbola, Olajide and Ahmad (2022) suggested that in other to reduce internet addiction among Nigeria undergraduates, they should be encouraged to observe the following:

1. Reduce the time spent going through some of the social network’s pages.
2. Engage more in verbal conversations with people rather than on social media platforms.
3. Keep away internet devices when with friends.
4. Engagement in real-life group discussions rather than on social networking sites.
5. Engaging in self-developing activities when alone and bored.
6. Get rid of notifications on phones.
7. Delete social network applications that are detrimental and install those that are healthy and important.
8. Get engaged with productive activities.
9. Regular self-reflection / self-assessment

**5. Conclusion**

Internet usage addiction is increasingly prevalent among university undergraduates in Nigeria. This addiction had led to various health challenges ranging from physical (body pain, thrombo-embolism, visual and hearing problems, etc.) to mental or psychological (depression, anxiety, mood change, insomnia, etc.) and also to problems of social wellbeing. Hence, there is a need for serious and decisive intervention in order to minimize the challenges being faced by students who are addicted to the internet. It is therefore recommended that:

i. Parents and guidance should develop good social interaction with their wards at an early stage in life instead of exposing them to too much internet usage that may later lead to addiction. Also, parents are required to act as role models, i.e., when they regulate their own pattern (frequency of access and time spent online) of Internet use, controlled Internet use can be enhanced among their wards. Parents are as well required to actively engage with their wards during Internet activities such as knowing the different social media platforms they visit; decisions on adaptive Internet use could be jointly made by the parents and their wards.

ii. University-based health awareness programs should be conducted on a regular basis on the dangers of Internet addiction and the need to regulate students’ internet use.

iii. Peer education programmes group on healthful internet usage should be established since peer influence is one of the major factors in internet addiction among students.

iv. Intervention programmes should be carried out on student’s internet use patterns to know the best preventive measures that can be appropriately employed to learners at each level of education.

v. Internet use education should be given to learners in order to curb the internet addiction pattern.

**Suggestions for future studies**

Based on the findings of this study, the following studies are suggested to be considered worth investigating by researchers.

1. Research on the influence of Internet addiction on the academic performance of university students.

2. Research on the effects of Internet use education on the prevalence of internet addiction among Nigerian university students.

**Disclaimer (Artificial Intelligence)**

Authors hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators were used during the writing or editing of this manuscript.

**Competing Interests**

This is to declare that authors of this manuscript have no competing interests.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

**REFERENCES**

Adiele, I. and Olatokun, W. (2014). Prevalence and determinants of Internet

addiction among adolescents. *Computers in Human Behavior*. 31,100–110. http://dx.doi.org/10.1016/j.chb.2013.10.028

Ajanaku, O. J. (2019). Utilization of the internet by undergraduate students of the

University of Ibadan, Nigeria. *International Journal of Science and Technology Educational Research*. 10(3), 30-36. http://www.academicjournals.org/IJSTER

Akanbi, M. L., Sulaiman, K. A. and Adeyemi, I. O. (2018). Psychosocial

consequences of intensive internet use among undergraduates of universities in Ilorin metropolis. *Library Philosophy and Practice (e-journal)*. 1761. https://digitalcommons.unl.edu/libphilprac/1761

Alabi, O. F. (2013). A Survey of Facebook Addiction Level among Selected Nigerian

University Undergraduates. *New Media and Mass Communication*. 1, 70-80. www.iiste.org

Ali, I., Kalsoom, O., Kazmi, S. A. J., Munir, T. A., Qayyum, Z., Akhter, N., & Jan, A.

A. (2019). Effect of internet addiction on academic performance and mental health of medical students*.* *Journal of Bahria University Medical and Dental College, 9*(1), 48-52. Karachi, Pakistan: Bahria University Medical & Dental College.

Almarabeh, T., Majdalawi, Y. K. and Mohammad, H. (2016). Internet Usage,

Challenges, and attitudes among university students: Case study of the University of Jordan. *Journal of software engineering and applications*. 9, 577-587. http://dx.doi.org/10.4236/jsea.2016.912039

Alotaibi, M. S., Fox, M., Coman, R., Ratan, Z.A. and Hosseinzadeh, H. (2022).

Smartphone addiction prevalence and its association on academic Performance, physical health, and mental well-being among University students in Umm Al-Qura University (UQU), Saudi Arabia. *International Journal of Environmental Research and Public Health* 19, 3710. https://doi.org/10.3390/ijerph19063710

Aly-baghdady, E.G., Shahin, E. S., Mohamed, A. A. and Abd Elrahman, S. G. E.

(2021). Physical and psychological effects of internet addiction among faculty of nursing students at Port Said University. *Port Said scientific journal of nursing.* 8(1), 275-293

Awoleye, O. M., Siyanbola,W. O. and Oladipo, O.F. (2008). Adoption assessment of

internet usage amongst undergraduates in Nigeria universities - A case study Approach. *Journal of technology management and innovation © Jotmi Research Group*. 3(1), 84-89. http://www.jotmi.org

Bolu-Steve, F. N., Oyeyemi, O. P. and Amali, I. O. O. (2015). Internet usage and

academic performance of undergraduate students in University of Ilorin, Nigeria. *Ethiop. J. Educ. & Sc.* 11(1), 39-47.

Ekechukwu, R. O. and Isukwem, G. C. (2020). Internet addiction and mental health

Comorbidities among students of the University of Port Harcourt, Nigeria. *British International Journal of education and social sciences.* 7(6), 105-113

Fagbola, O. O., Olajide, A. A. and Ahmad, A. (2022). An assessment of social

networking sites addiction among female undergraduate students in Kwara State, Nigeria. *Mediterranean journal of social & behavioral research. 6*(3)75-83. https://doi.org/10.30935/mjosbr/12079

Goodwill Community Foundation. (2013). *Internet.* Goodwill Community Foundation,

Raleigh, NC. [LearnFree.org](https://www.gcflearnfree.org).

Hagrass, S. A. A. and ELSayed, E. H. M. (2021). Negative health effects on

addiction of internet among primary schools students in Zagazig City. *Saudi J Nurs Health Care, 4*(7), 189-204. https://saudijournals.com

Haque, M., Rahman, N. A. A., Majumder, M. A. A., Haque, S. Z., Kamal, Z. M.,

Islam, Z. Haque, A. T., Rahman, N. I. A and Alattraqchi, A.G. (2016). Internet use and addiction among medical students of University Sultan Zainal Abidin, Malaysia. *Psychology Research and Behavior Management***.** 9, 297–307.http://dx.doi.org/10.2147/PRBM.S119275

Jahanian, R. and Seifury, Z. (2013). The impact of internet addiction on students'

mental health in technical and vocational colleges in Alborz Province. *Middle-East Journal of Scientific Research* 14(11), 1533-1538. DOI: 10.5829/idosi.mejsr.2013.14.11.447

Lebni, J. Y., Toghroli, R., Abbas, J., NeJhaddadgar, N., Salahshoor, M. R.,

Mansourian, M., Gilan, H. D., Kianipour, N., Chaboksavar, F., Azizi, S. A. and Ziapour, A. (2020). A study of internet addiction and its effects on mental health: A study based on Iranian University Students. *Journal of education and health promotion*. 9(205),1-8. <https://www.jehp.net>.

Massoud, M. and Uyanga, B. (2013). Factors Influencing Internet Addiction among

Adolescents of Malaysia and Mongolia. *Jurnal Administrasi Bisnis. 9(2), 101–116.* (ISSN: 0216–1249)

Mboya, I. B., Leyaro, B. J., Kongo, A., Mkombe, C., Kyando, E. and George, J.

(2020). Internet addiction and associated factors among medical and allied health sciences students in northern Tanzania: a cross-sectional study. *BMC Psychology* 8(73),1-8. https://doi.org/10.1186/s40359-020-00439-9

Miao, X., Jiang, X., Wang, P., Li, H., Wang, M. and Zeng, H. (2018). Online activities,

prevalence of Internet addiction and risk factors related to family and school among adolescents in China. Addictive Behaviors Reports. 7, 14–18. https://doi.org/10.1016/j.abrep.2017.10.003

Nadhirah, H., Normala, R, Lukman, Z. M., Azlini,C. and Kamal, M.Y. (2018). Internet

addiction among secondary school students in Kota Bharu, Kelantan, Malaysia. *International Journal of Research and Innovation in Social Science,* 11(12), 108-114. www.rsisinternational.org

Ogboghodo, E.O., Omoregie, E.K., Omoike, E. and Omuemu, V. O. (2018).

Knowledge of and attitude towards internet addiction among undergraduate students in University of Benin, Edo State, Southern Nigeria. *Nigerian journal of health sciences*. 18(2) 51-57. http://www.chs-journal.com

Ogbomo, M. O., & Ivwighreghweta, O. (2016). Internet addiction among

undergraduates in universities in Delta State, Nigeria. International Journal of Academic Library and Information Science*, 4*(4), 110-116. Academic Research Journals. <http://www.academicresearchjournals.org/IJALIS/Index.htm>.

Ogungbeni, J. I, Adekanye, A. O., Bamigbose, A. A. and Sulaiman, M. A. (2016).

Internet use among undergraduates in Nigeria: The role of policy. *Journal of information & knowledge management.* 6(6), 87-94. https://www.researchgate.net/publication/345805630

Ojeniyi, R. O. (2015). Influence of electronic media use on sexual behaviour of

undergraduates in University of Ibadan, Ibadan, Nigeria. *Journal of Teaching and Education, 4*(1), 357–363. Retrieved from https://www.universitypublications.net/jte/0401/pdf/U4K161.pdf

Olatokun, W. M. (2008). Internet access and usage by secondary school students in

a Nigerian municipality*.* *South African Journal of Libraries and Information Science, 74*(2), 138-148.

Olawade, D. B., Olorunfemi, O. J., Wada, O. Z., Afolalu, T. D., & Enahoro, M. A.

(2020). Internet addiction among university students during COVID-19 lockdown: Case study of institutions in Nigeria. *Journal of Education and Human Development,* 9(4), 164-173. New York, NY: American Research Institute for Policy Development. <https://www.researchgate.net/publication/348834811>.

Omoyemiju, M. A. and Popoola, B. I. (2021). Prevalence of internet addiction among

University students in Nigeria. *British Journal of Guidance & Counseling.* 49(1), 132-139. https://doi.org/10.1080/03069885.2020.1729339

Quaglio, G., & Millar, S. (2020). *Potentially negative effects of internet use.* Scientific

Foresight Unit (STOA), European Parliamentary Research Service, Brussels, Belgium. <http://www.europarl.europa.eu/stoa>.

Raveendran, R., Jose, R., Jacob, S. R., George, A. S., Vinayak, N., Mubashir M. K.,

Greeshma, S., Unni, R. and Aswani K. S. (2021). Internet usage among medical students: prevalence, addiction and health issues. *International Journal of Community Medicine and Public Health. 8(8), 4030-4036.* http://www.ijcmph.com

Safiah, S., Norliah, K., Siti Z. I., Massila, K., Mahadi, A. H. & Shahrulanuar, M.

(2016). Factors influencing internet addiction among university students: A review. *Science International (Lahore), 28*(2), 1343-1346. <https://www.researchgate.net/publication/301892120>.

Sulki, C., Jaekyoung, L. & Hae, K. L. (2019). Personal factors, internet

characteristics, and environmental factors contributing to adolescent internet addiction: A public health perspective. *International Journal of Environmental Research and Public Health, 16*(2), 1-16. [www.mdpi.com/journal/ijerph](https://www.mdpi.com/journal/ijerph).

Taha, M. H., Shehzad, K., Alamro, A. S. and Wadi, M. (2019). Internet use and

addiction among medical students in Qassim University, Saudi Arabia. *SQU Medical Journal.* 19(2), e142-e147. https://doi.org/10.18295/squmj.2019.19.02.010

Xianhua, W., Xinguang, C., Juan, H., Heng, M., Jianghong, L., Liesl, N. & Hanrong,

W. (2013). Prevalence and factors of addictive internet use among adolescents in Wuhan, China: Interactions of parental relationship with age and hyperactivity-impulsivity. *PLOS ONE, 8*(4), 1-8. <https://doi.org/10.1371/journal.pone.0061782>

Xiaoli, N., Hong, Y., Silu, C. and Zhengwen, L. (2009). Factors influencing internet

addiction in a sample of freshmen university students in China. Cyberpsychology & Behavior. 12(3), 326-330 https://www.researchgate.net/publication/24430602

Young, K. S. (1996). Internet addiction: The emergence of a new clinical disorder.

*CyberPsychology & Behavior, 1*(1), 237-244.

Young, K. S., & Rogers, R. C. (1998). The relationship between depression and

internet addiction. *CyberPsychology & Behavior, 1*(3), 25–28.

Zewde, E. A., Tolossa, T., Tiruneh, S. A., Azanaw, M. M., Yitbarek, G. Y., Admasu,

F. T., Ayehu, G. W., Amare, T. J., Abebe, E. C., Muche, Z. T., Fentie, T. A., Zemene, M. A. & Melaku, M. D. (2022). Internet addiction and its associated factors among African high school and university students: Systematic review and meta-analysis. *Frontiers in Psychology, 13*. https://doi.org/10.3389/fpsyg.2022.847274