



## Prevalence and determinants of Internet addiction among adolescents



Ikenna Adiele<sup>a</sup>, Wole Olatokun<sup>a,b,\*</sup>

<sup>a</sup> Africa Regional Centre for Information Science, University of Ibadan, Nigeria

<sup>b</sup> Information Studies Programme, University of Kwazulu Natal, South Africa

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### ABSTRACT

**Background:** Globally, it is agreed that the internet can serve as a tool that enhances well-being but there is no consensus regarding what constitutes problematic internet use and internet use relationship with offline behavioural addictions. This study was conducted to investigate the prevalence of Internet addiction (IA) among adolescents and to determine whether it is a distinct disorder from offline behavioural addictions.

**Methods:** Using survey design, a total of 1022 University adolescents comprising undergraduates and postgraduates were selected using stratified random sampling. Data were collected using the Revised Internet Addiction Test (RIAT), a questionnaire made up of EPQR-S Lie Scale, Internet Addiction Test (IAT), Internet Use Reasons, Hypersexual Behaviour Inventory and Problem Video Game Playing Scale.

**Results:** There was prevalence of IA among the adolescents; the prevalence rate was 3.3%, in a male to female ratio of approximately 3:1. Adolescents' online addiction was mainly influenced by extrinsic reasons for internet use, although there were few whose reasons for going online were mainly intrinsic. Using the internet to communicate on important matters, getting sex-oriented materials, and making money (especially amongst females) seemed to dominate addicts' minds; thus, majority were 'addicts on the internet' and not 'addicts to the internet'.

**Conclusions:** Offline behavioural addictions was not an IA causal factor but rather a motivating factor, while intrinsic reasons for internet use was not found to be a reliable factor for distinguishing addicts from non-addicts.

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### 1. Introduction

Many empirical studies have raised awareness on the addictive nature of internet use which can be abnormal. However, some researchers argue that a person's excessive use of the internet is a behavioural manifestation of other problematic conditions in their lives, and thus, doubt the reality of the existence of this disorder (Thatcher et al., 2008, as cited in Frangos, Frangos, and Kiohos (2010); Widyanto and Griffiths (2006)). With the emergence of internet technologies, an online absolute and effective communication space drawing people of diverse interests unfolded (Dimple & Christy, 2011; Comer, 2009, as cited in Ogunrewo and Odusina (2010)). It is obvious why internet technology is earning an unavoidable dependency from many, mostly young adolescents (Hoffman, Novak, & Venkatesh, 2004; Kuss & Griffiths, 2012; Ma, 2011).

Excessive and compulsive internet use, also seen as a form of technological addiction (Marks, 1990, as cited in Widyanto and Griffiths (2006)) touches a large scope of behavioural responses

characterized by problematic self-control. Therefore, it seems interesting to study, although quite puzzling why more problems that need solving arise as more invention of different technologies to make life easier take place. Internet addiction is a recent and fast growing clinical phenomenon (Saville, Gisbert, Koppo, & Telesco, 2010; Young, 2004), and one of such problems emerging from internet use (Bertagna, 2009; Wan & Chiou, 2007; Murali & George, 2007; Shapira et al., 2003; Young, 1998, as cited in Akin and Iskender (2011); Christakis & Moreno, 2009, as cited in O'Keeffe, Clarke-Pearson and Council on Communications and Media (2011)). Many countries have come to see Internet addiction as a potential threat to public health, with a country like China reporting that about 10 million of its young people test positive to Internet addiction (Block, 2008). Evidence on ground calls for concern, because online addiction to some games, cybersex and viewing of pornography can give rise to harmful behaviours and sexual tendencies (Longe et al., 2007), for the fact that such adult websites and applications present themes of behavioural violence (Flood, 2009).

However, Internet addiction critics disagree with the view of Internet addiction as a distinct disorder, emphasizing that the internet is not a substance but a medium of information exchange (Chakraborty, Basu, & Kumar, 2010). They generally emphasize

\* Corresponding author at: Africa Regional Centre for Information Science, University of Ibadan, Nigeria. Tel.: +234 8059767412.

E-mail address: [woleabbeyolatokun@yahoo.co.uk](mailto:woleabbeyolatokun@yahoo.co.uk) (W. Olatokun).

that Internet addiction may have a link to internet user's psychiatric history, which entails attention deficit/hyperactivity disorder (ADHD), depression, impulse control disorders (ICDs), substance overuse, social loneliness and anxiety (Yen et al., 2008; Han et al., 2009; Lee et al., 2008; Primack et al., 2009; Caplan, 2007; Parker et al., 2008, as cited in [Recupero \(2010\)](#)). Even Ivan Goldberg who amusingly founded a standard for Internet addiction and the online Internet Addiction Support Group in the 1990s disbelieves in Internet addiction (Suler, 2004a, as cited in [Morahan-Martin \(2008\)](#)). Griffiths (2000a) as cited in [Widyanto and Griffiths \(2006\)](#) also argues that people who are excessive internet users are not internet addicts, stressing that they simply use the internet to stimulate behavioural addictions. He claimed that the internet is only a medium where these people freely manifest their addictive behaviours. He buttressed his claims, explaining that some people may be spending excessive time on the internet out of career fulfillment or keeping online social affair with someone far away, and also pinpoints that the internet's capabilities of allowing users to hide their identities online and its unrestrictive nature encourages addicts to use it as a medium. These views also lead to the proposition that behavioural addictions concerning extreme human-machine communication are technological addictions ([Griffiths, 2004](#); Griffiths, 1997, as cited in [Chirita, Ilinca, Chele, and Chirita \(2007\)](#)). This behaviourists' view of Internet addiction is also supported by [Leon and Rotunda \(2000\)](#) (as cited in [Widyanto and Griffiths \(2006\)](#)), who argued in the same perspective that to assume frequent use of the internet as excessive, pathological or addictive is a naive attempt neglecting dispositional and contextual factors related to the behaviour.

However, some other research studies indicate the prevalence of Internet addiction, and therefore imply otherwise ([Canbaz, Sunter, Peksen, & Canbaz, 2009](#); [Fisoun et al., 2012](#); [Liu, Bao, & Wang, 2010](#); [Odaci & Kalkan, 2010](#); [Sepehran & Lotf, 2011a,b](#)). Research studies concluded that Internet addiction (IA) has similar symptoms with other impulse control disorders ([Morahan-Martin, 2005](#); [Shapira et al., 2003](#)), and that it is uncertain if it results from other psychiatric illnesses ([Aboujaoude, Koran, Gamel, Large, & Serpe, 2006](#); [Shapira et al., 2003](#); [Shaffer et al., 2008](#), as cited in [Ko, Yen, Chen, Chen, and Yen \(2008\)](#)). With the existing divergent views over Internet addiction, a strong controversy mounts on whether Internet addiction deserves inclusion into the Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition (DSM-V) or not ([Block, 2008](#); [Pies, 2009](#)) as cited in [Ameen \(2010\)](#). However, there is also an indicative prevalence of both Internet addiction and behavioural addiction ([Munoz-Rivas, Fernandez, & Gamez-Guadix, 2010](#)).

Internet addiction has been widely identified as an abnormal condition that arises out of internet use. By using pathological gambling as a model, whose predictor-factors gave rise to the criteria for measuring IA, [Young \(1996\)](#) theoretical definition sees IA as excessive time spent on many internet activities to the extent of incurring adverse effects on user's physical and psychological health, expressed in his or her academic, professional, social and marital relationships, and other facets of life ([Ozcan & Buzlu, 2007](#), as cited in [Azim, Zam, and Rahman \(2009\)](#)). Several studies have shown that the factor 'negative outcomes' predicts level of IA among internet users.

However, literature exposed that critics disagree on the existence of IA, doubting the empirical evidence of studies that measured IA, with the major view that the different criteria adopted by most of the studies did not consider two important factors, namely: 'reason for internet use' and 'offline behavioural addictions'. This study therefore aims to investigate if there is prevalence of IA among adolescents with respect to these two aforementioned factors, and whether IA is a distinct disorder not caused by offline behavioural addiction(s). Hardly did any study investi-

gate IA using this approach, even with the existence of the dilemma of co-morbidity of addictions. It is out of this condition that the need to provide a substantial evidence on IA is deemed necessary.

## 2. Literature review and constructs

### 2.1. Negative outcomes

By operational definition, Salience is defined by five observable characteristics. It is a preoccupation with thoughts of the internet to the extent that life's disturbing thoughts are blocked with soothing thoughts of the internet, causing an internet user to prefer spending time online rather than socializing with others which continually instills the fear that without the internet, life will go sour and if disturbed by others when online, user becomes upset. [Mythily, Qiu, and Winslow \(2008\)](#) and [Liu et al. \(2010\)](#) surveyed students in Singapore and China. Their studies individually employed random selection of schools and random stratified cluster sampling, using a 69-item questionnaire and the Young's diagnostic instrument for IA. Both found that 'salience' was an addictive internet behaviour exhibited by addicts. This suggests that an addict is disturbed with thoughts of the internet when offline so as to get satisfied once again. More so, a relationship has been established to exist between IA or excessive use and long time spent on internet use. By operational definition, excessive use is the spending of long time online to the length of losing sleep due to internet use at nights, which causes the user to neglect important activity/activities rather than not spending more time online, and accompanied by an attempt to hide extent of internet use and mood modification when user is offline. Evidence of excessive use is seen in the study by [Rooij, Schoenmakers, Vermulst, Eijnden, and Mheen \(2010\)](#) and [Isiklar, Sar, and Aksoz \(2011\)](#). Both studies selected sample from amongst high school students. While Rooij et al. aimed at identifying addicted online gamers, Isiklar et al. examined predictor variables for IA. Both studies added to knowledge that the level of addictive use or excessive use of the internet increases linearly as hourly time spent on online activities rises. This suggests that the more often a user stays online, the higher the likelihood of being addicted. [Odaci and Kalkan \(2010\)](#) whose survey study in Turkey used the Online Cognition Scale and [Liu et al. \(2010\)](#) who surveyed 380 students, observed that excessive internet users felt bored when not online. Thus, feeling bored could be associated to excessive use. On a similar observation, [Munoz-Rivas et al. \(2010\)](#) examined the relationship between time spent connected to the internet and the predictor factors of pathological and addictive use of the internet. They identified irritating and anxious feelings to be symptoms exhibited by excessive users as a result of spending lengthy time on the web. This indicates that moody conditions also relates to excessive internet use (EIU). In addition, [Young \(2007\)](#) conducted a research with the aim of investigating the efficacy of employing cognitive-behavioural therapy for internet addictive users, and 3 years later [Frangos et al. \(2010\)](#) set out to estimate the prevalence rate of IA amongst students in Greek University. Both studies found that addicts exhibited computer/internet use excessiveness, which could have led to sleep deprivation due to late-night internet use. Sleep deprivation therefore may relate to EIU. Still on excessive use, [Christakis, Moreno, Jelenchick, Myaing, and Zhou \(2011\)](#) examined PIU in US college students, and reported that most admitted using the internet above the time they wanted. This is another pointer that IA is could be associated to time duration of internet use. And [Yen et al. \(2008\)](#) before Christakis et al., carried out a study to compare psychiatric symptoms between adolescents with and without IA, as well as between analogs with and without substance use. Nevertheless, evidence from both studies reveal that depression and IA

are correlated, and as depression level increases, so the tendency to use the internet excessively.

EIU is significantly related to poor academic outcome. By operational definition, neglect of academic work can be defined as the suffering of an internet user's study activities which result to low academic performance due to length of time devoted to online use, and also accompanied by a defensive or secretive attitude when asked of online activity. This fact is supported in [Mythily et al. \(2008\)](#), [Young \(2007\)](#), [Liu et al. \(2010\)](#), [Frangos et al. \(2010\)](#), [Azim et al. \(2009\)](#) and [Isiklar et al. \(2011\)](#). These studies reported that adolescents who are excessive internet users admitted that their scores and class assignments nearly declined all the time due to internet use. The possible reason for poor academic performance is seen in [Young \(2007\)](#), whose student-patients due to internet use exhibited inadequate study habits, could not meet-up with lectures, or lose concentration owing to sleep deprivation. Thus, with the findings, [Liu et al. \(2010\)](#) came to conclusion that problematic internet activities correlates negatively with students' grades. Therefore, poor academic scores are a predictor variable for IA ([Frangos et al., 2010](#)). Nonetheless, it appears poor grades may not always predict IA going by the finding of [Azim et al. \(2009\)](#). They examined IA between Malaysian male and female undergraduate human sciences students of the International Islamic University in Malaysia. In their case, only 2% of addicted students admitted a downward trend in their average grade point. Also addiction levels may rise as school grades decline. This relationship is an observation from the findings of [Isiklar et al. \(2011\)](#).

Anticipation has been observed to relate with IA. By operational definition, anticipation is seen as a craving to go online to access object of thought which often involves accessing it immediately when logged-in in neglect of important online activities like checking of e-mails. [Munoz-Rivas et al. \(2010\)](#), who surveyed 1301 university students in Spain found that excessive internet users in their study felt the desire to use the internet when they are offline. This is an indication that addicted users may be experiencing impulsive thoughts and lack of control over use.

Lack of control is a major predictor of IA. By operational definition, lack of control is defined as failure to reduce internet use rate after trial, involving the need for more time when using the internet, and complaints from close relations due to rate of internet use. [Young \(2007\)](#) in its study in US that sampled 114 clients reported similar finding with [Munoz-Rivas et al. \(2010\)](#), that respondents had problem with control of internet use. These two studies also observed that addicts attempted to reduce their internet use for more than once but failed. This condition is identified as relapse, and this finding indicates that relapse is related to inability to control internet use. More light was thrown on 'lack of control' with the report from [Munoz-Rivas et al. \(2010\)](#) that excessive users in their study admitted to gradually increasing the time duration they spend online to derive more satisfaction. This is another pointer that may signify that increasing use-time to gain more satisfaction relates to lack of control over internet use.

Salience, anticipation and lack of control may suggest that addicts will have poor social stability. By operational definition, neglect of social life is seen as preference for internet use rather than socializing with friends, which affects the rate of online involvement in creating new relationships with others. This is suggested from the finding of [Mythily et al. \(2008\)](#) through its analysis of 2735 surveyed students which involved collection of data on demographic constructs, academic performance, social support and well-being. The study reported that participants who used the internet excessively were much likely to be involved in social life in lower degree, and that addicts gain the highest social capital from internet use. Consequently, the inverse seems possible. This was confirmed from [Hardie and Tee \(2007\)](#)'s study which aimed at surveying a mixed sample of adult internet users concerning

their internet use. From their findings, they suggested that excessive users spent time engaging in online interactive activities so as to avoid being socially lonely. Therefore, it appears that these 'negative outcomes' are common across research studies, and correlates with IA. Thus, we hypothesize that:

**H1.** 'Negative outcomes' is a significant predictor of IA levels among adolescents.

## 2.2. Reasons for internet use

It is evident that certain behavioural activities on the internet are paid greater attention to amongst addicts, and this has led researchers to understudy them and observe that these online activities could actually predict Internet addiction. It is yet another measure of severity to employ this means to ensuring that real online addicts are spotted without over estimation of the incidence of the problem which could occur when approaching IA from only one assessment technique. [Canbaz et al. \(2009\)](#) investigated the prevalence of problematic internet use (PIU) among adolescents, in relation to different internet activities, and the excessive use of the internet in Samsun, Turkey. They reported that using the internet is the most performed activity with the computer, while online behaviours most performed were interactive gaming, sourcing for information and chatting. In another study by [Fisoun et al. \(2012\)](#), Young's diagnostic questionnaire for IA and the IAT were administered to 1270 adolescent students. Findings revealed that the possibility exist for males with greater addiction to use the internet for personal satisfaction (stimulated by the appealing or sexual nature of the web application(s)), and females favouring social communication. They further noted that internet pornography significantly predicted higher levels of online addiction.

[Young \(2007\)](#) finding struck a similarity with [Fisoun et al.'s](#) study. In her study, internet sexual activities, gambling and gaming behaviours mostly predicted men's addiction, whereas women's addiction is majorly inclined to internet chatting and use of internet auctions. Thus, Young's findings suggest that chatting is highly engaged in by majority of women, and internet pornography by men. More so, the study by [Frangos et al. \(2010\)](#) came up with yet another similar result. The study used a stratified random sampling to select 1876 Greek students. Its findings indicated that pleasure and leisure were main reasons for males' online use, and learning and social interaction purposes signifying the primary use by females. Thus, the study reported that IA was predicted by watching online sexual sites, and that internet game playing was not a risk to online addictive behaviour.

However, a contrasting finding from [Liu et al. \(2010\)](#) indicates that medical students' internet use did not favour online trading and buying, and online sexual and gaming activities, but rather that their activities were mainly for knowledge search and social communication. Consequently, [Douglas et al., 2008](#) conducted a study to provide a meta-synthesis of qualitative data of primary studies on IA conducted on human subjects. They sampled 10 qualitative research articles from 5 academic and research databases using key terms and defined inclusion and exclusion criteria, covering a 10-year period from 1996 to 2006. This document analysis study reported that online addicts were attached to the internet for socialization and learning reasons. In another development, [Azim et al. \(2009\)](#) used purposive sampling to select 50 students, and collected survey data using Young's IAT. High scorers in the IAT mostly engaged in web-surfing and composing of electronic mails on the internet.

These studies indicate the use of the internet for intrinsic reasons (sexual activities whether through chatting or watching of online pornography, gaming and other entertainment activities,

web-surfing for pleasure, etc.) and extrinsic reasons (educational purposes, work reasons, learning, chatting to gain awareness or learn, etc.). However, it is obvious from majority of these studies that pleasure and leisure (intrinsic) are major reasons that increase risk to IA. Thus, we hypothesize that:

**H2.** 'Mainly intrinsic reasons for internet use' is a significant predictor of IA among adolescent-addicts.

### 2.3. Offline behavioural addictions

Offline behavioural addictions, also taken as forms of psychiatric illness or mental disorder can co-occur with IA. Therefore, there is need to ensure that IA is not an effect of an underlying offline behavioural addiction, if the view that IA is discrete disorder is to gain an additional ground. Yen et al. (2008) undertook a unique study that involved 3662 students as recruited study participants, and used the Brief Symptoms Inventory, Chen IA Scale, and Questionnaire for Experience of Substance Use. The findings suggested that the internet may serve as a means to relieve or manage emotional problems to people having strong effects of a mental disorder. And the study's results further suggested that effects of mental disorders can trigger or sustain IA. Yen et al.'s study may imply that an offline behavioural addict may use the internet to fuel or satisfy his offline addictive behaviour, causing such a person to be addicted to the internet. To this effect, there is evidence that a significant relationship exists between an increase in PIU and offline behavioural activities of males and females (Fisoun et al., 2012).

However, an observatory conclusion suggests that a comorbidity of some offline behavioural addictions with IA is highly impossible (Kuss & Griffiths, 2011). This seems to be buttressed from the observation made by Sussman et al. (2011) in their study which presents the PACE model as a model for explaining specificity of addictions. The study suggests that an addict to a lower offline compulsive behaviour is also more likely to be addicted to another lower offline compulsive behaviour, rather than a highly compulsive behaviour. With the study's observation, the study is of the suggestion that exercise addiction may go with work addiction, less likely with problem video game playing.

Moreover, it is evident from some other reviewed studies (Canbaz et al., 2009; Fisoun et al., 2012; Young, 2007) that online pornography and gaming addictions account for high addiction level amongst addicts. The observatory explanation of Frangos et al. (2010) brings to light that mens' online use centers more on sexual satisfaction and high involvement in internet gaming when compared to women's internet use. This suggests that hypersexual and problem video game playing offline behavioural addictions may play a major role in causing or sustaining students addiction to the internet, and therefore making offline behavioural addictions a good factor for recognizing student addicts to the internet (without an offline addiction). Thus, we hypothesize that:

**H3.** 'Offline behavioural addictions' is a significant predictor of IA among addicts who use the internet mainly for intrinsic reasons.

### 2.4. Gender

Studies have identified a unique pattern of IA occurrence, following the unfolding of gender studies in this area. With the awareness that gender is a predictor of addictive online behaviour (Sepehrian & Lotf, 2011a), Azim et al. (2009) posited that contrasts in gender and behavioural patterns in age categories reflect in IA studies. In the study carried out by Azim et al., it was found that observable negative effects marked greater number of online users

who were males, whereas a greater proportion of females were moderate online users. More so, whereas the studies Frangos et al. (2010), Mythily et al. (2008), Serin (2011), Canbaz et al. (2009), Fisoun et al. (2012), Odaci and Kalkan (2010), Ko et al. (2008), Sepehrian and Lotf (2011b), and Chakraborty et al. (2010) found and suggested that the males suffer more from IA than females, Frangos et al. (2010) added that male gender is a moderate predictor of IA, and Mythily et al. (2008) suggested from their finding that males' IA addiction is probably two times as much as that of females. The only differing finding was from Hardie and Tee (2007); who observed that moderate and PIU was evenly engaged-in by both males and females. Thus, in light of these findings, we hypothesize that:

**H4.** There is a significant difference in gender between male and female addicts who use the internet mainly for intrinsic reasons, and not addicted to offline behavioural addictions.

**H5.** Gender is a significant predictor of IA amongst addicts.

### 2.5. Average time spent per week on internet use reason

Odaci and Kalkan (2010) investigated PIU among 493 accidentally sampled young adult students in Education faculty, Karadeniz Technical University, and examining its correlation to loneliness and dating anxiety. The study found that users who spend above 5 h daily on the internet showed significant symptom of excessive internet use compared to those who use the medium for less than 5 h daily. However, Mythily et al. (2008) who examined prevalence and correlates of EIU among 2735 students from 8 selected schools came up with the evidence that some who were excessive users spent 5 h weekly on average to surf the web, and it caused them problems in studies. Evidences from these studies suggest that number of hours spent weekly on internet use reason is related to addictive internet use. Thus, we hypothesize that:

**H6.** 'Average time spent per week on internet use' is a significant predictor of IA among addicts who use the internet mainly for intrinsic reasons, and not addicted to 'offline behavioural addictions'.

**H7.** There is a significant relationship between 'average time spent per week on internet use' and adolescents' IA levels.

And generally it is clear from different literature that these predictor-factors influence IA, and have been used in predicting internet users' addiction to the internet or problematic internet use. Thus, in a collective sense, we hypothesize that:

**H8.** 'Mainly intrinsic reasons for internet use', 'offline behavioural addictions', gender and 'average time spent per week on internet use' are significant predictors of IA among adolescents.

## 3. Method

Ethical clearance to conduct this study was sought and obtained from the University of Ibadan/University College Hospital ethics committee.

### 3.1. Design

Survey research design was adopted, which involved the process of administering questionnaires on a sample drawn from the population of study. The design examined how the variables of

study predict IA. The data were processed with SPSS software, version 17.

### 3.2. Participants

The sample consisted of 5% (supported by Brown (2012)) adolescent student-population drawn from a homogeneous population consisting of males and females. Of the 1022 surveys administered, 809 were returned. 19 Surveys were removed, belonging to respondents who did not either provide response to the Lie scale or the IAT. Excluded respondents who could not give genuine responses from the Lie scale, left the current study with a final sample of 450 adolescents of both sexes (47.42% males and 50.17% females).

### 3.3. Evaluation instrument

The instrument of data collection administered was titled Revised Internet Addiction Test (RIAT); a combination of different validated research scales explained below.

### 3.4. EPQR-S Lie Scale

The short-form of the revised Eysenck Personality Questionnaire's Lie scale was adopted from the study – Francis, Lewis, and Ziebertz (2006), which explored the psychometric properties of the German translation of the EPQR-S. This scale was made up of 12 dichotomous items with yes/no response options that measure lying as a personality factor, with questions framed from daily behaviours hard to deny; example, “Are all your habits and behaviours desirable ones?, Have you ever cheated in a game?, Have you ever taken advantage of someone?”, etc. Each of the ‘yes’ and ‘no’ options has a score of 1, with more ‘no’ responses indicating a lying personality and vice versa. Some of the items were modified to create a better understanding from a respondent's view. For item 2 (item 8 on EPQR-S) – “were you ever greedy by helping yourself to more than your share of anything?”, was rephrased to “have you ever been greedy by helping yourself to gain more than your share of something?”; for item 8 (item 33 on EPQR-S) – “As a child, were you every cheeky to your parents?”, was modified to “when you were a child, was there a single time you disrespected your parents?”; for item 12 (item 47 on EPQR-S) – “Do you sometimes put off until tomorrow what you ought to do today?”, was rephrased to “Are there times you shift what you have to do on a day to another day?”. Alpha coefficients of 0.77 and 0.73 (for males and females) (Eysenck et al., 1985), 0.65, 0.66, 0.70, and 0.71 (Francis et al., 1992) have been reported (Francis et al., 2006). Francis et al. (2006) also reported a reliability value of 0.7 for this scale, and stated that it is adequate. This scale is administered as a measure of validity and to ensure that the probability of biasness is taken care of.

### 3.5. Gender and average time spent per week on internet use reason

These variables were assessed using items 13 and 14. Range of time (in hours) was provided and they are: 0–12, 13–23, 24–34, 35–45, and above 45 h.

### 3.6. Young's Internet Addiction Test

IA was measured using Young's Internet Addiction Test (IAT), which was adopted from the study – Azim et al. (2009). It contains 20 items scored on a 5-point scale (from 1 to 5), with 1 – “never”, 2 – “occasionally”, 3 – “frequently”, 4 – “often”, and 5 – “always”. The 20 items measure the 6 negative outcomes or factors of IA. Only item 6 (Q2 on IAT scale) – “How often do you neglect course-

work/assignments to spend more time online?” was modified into “How often do you neglect your course/home work to spend more time online?”.

Sepehrian and Lotf (2011b) reported that marks for this test ranged from 0 to 100, with higher mark indicating higher level of addiction to/on the internet. After a final mark is known, interpretation was based on the following criteria:

<20	non-dependence (not an internet user)
20–49	normal users
50 – 69	moderate addiction (at-risk group)
70–100	severe addiction (addicts' group)

The above criteria for IA levels were as conceived and used in Fisoun et al. (2012). Validation of this test was performed among adults, and its use in studies is global (Christakis et al., 2011). A very good internal consistency was reported for this instrument, with an alpha coefficient of 0.93 (Hardie & Tee, 2007) and 0.81 (Canbaz et al., 2009). Yoo and colleagues, as well as Whang and colleagues, also reported a Cronbach alpha coefficient for this scale as greater than 0.9; Qasemzadeh obtained this same value as 0.833; and Dargahi reported 0.88 (Sepehrian & Lotf, 2011b). As well, Azim et al. (2009) calculated the reliability score for this test as 0.89.

### 3.7. Reasons for internet use

This variable was assessed using possible responses that can be given to average weekly internet use time. Twenty-eight options or possible responses were adopted from the study of Kraut, Lundmark, Kiesler, Mukhopadhyay, and Scherlis (1997) and the Ruder Finn Intent Index. These options included: to manage finances, to influence others, and to learn about local events. Fourteen were classified as extrinsic reasons (to compare products, to get product information, to sell something, to advertise, to manage finances, to make money, to do work duties, to communicate with my fiancé/ fiancée, to communicate on important matters, to get educational information, to do school work, to get employment information, to visit chat-rooms, auctions and forums for vital discussions, and to get personal help), while the other reasons were grouped as intrinsic reasons (to buy something, to enjoy myself, to join a cause, to influence others, to play games, to get hobby information, to download things, to listen to music, to get sex-oriented materials, to communicate with others so as to have fun, to read news, to visit chat-rooms so as to have fun, to meet new people, and to learn about local events).

### 3.8. Hypersexual Behaviour Inventory

The Hypersexual Behaviour Inventory (HBI) assessed hypersexual offline behavioural addiction. It was adopted from the study – Reid, Garos, and Carpenter (2011). It is a 19-item self-report tool measuring three main key areas: control, coping, and consequences. These three areas measured: (1) the extent to which a respondent uses sex to cope with uncomfortable or unpleasant affective experiences (escape); (2) a respondent's hypersexual behaviour outcomes; and (3) an individual's control over sexual thoughts (salience), cravings (anticipation), and behaviour. Items 36–42 measured coping; items 43–46 measure consequences; and items 47–54 assessed control. Its items were endorsed on a 5-point Likert-type scale ranging from 1 (Never) to 5 (Very Often), and its scores ranging from 19 to 95. A score of 53 and above indicates that a respondent had hypersexual problems. Reliability score of control, coping, and consequences subscales are quite high, with this tool's overall score as 0.96.

### 3.9. Problem Video Game Playing Scale

Offline behavioural addiction on Problematic game playing was assessed with the Problem Video Game Playing Scale (PVP). Loton (2007) reported that this scale was developed with an adolescent data sample, and it is based on diagnostic criteria for substance overuse, coupled with that of DSM-IV pathological gambling. It was a 9 item dichotomous scale consisting of nine questions that assessed an individual vulnerability to problematic video game play (Salguero & Moran, 2002, as cited in Loton (2007)). An example of an item on this scale is “When I can't play video games I get restless or irritable”. The scores range from 0 to 9, and they reflect the criteria for preoccupation (salience), tolerance (lack of control), loss of control, withdrawal (excessive use), escape, lies and deception (excessive use), neglect of physical or mental outcomes, social, academic and work problems. For the purpose of this study, a score of 5 and above indicate a problematic video game player, while a score below 5 indicates a recreational player. Salguero and Moran (2002) as cited in Loton (2007), found the internal consistency of this scale to be  $\alpha = 0.69$ , with the entire 9 items adding to this coefficient score. Validity of this scale was reported by Loton (2007). These nine PVP items are known to measure problems associated with video game playing. Since this scale is scarce commercially, trials to obtain permission from the authors were exercised but proved futile.

### 3.10. Procedure

Stratified random sampling method was used to divide the population into different strata with respect to 100, 200, 300, 400 and Postgraduate levels of each faculty. Since most faculties in University of Ibadan, do not have 500 and 600 levels, these levels were neglected in order to achieve fairness in selecting equal number of strata for this study. The Postgraduate (PG) diploma, Master and Ph.D level students were treated as a single unit called 'PG level'. From the ratio of maximum to the minimum number of departments in U.I, 3 departments were randomly selected from each faculty, and for each department or programme, a cluster sampling was used, taking classroom as the sampling unit. Participating classrooms were randomly selected and students' availability in the classroom was taken into cognizance. Before administration of research instrument, participants were information that the test was part of a research study on Internet addiction prevalence. Consent was equally sought from students who voluntarily participated.

### 3.11. Data analysis

Analysis was based on returned questionnaires. Statistical Package for Social Sciences (SPSS), version 17 was used for the analysis. Initial analysis was to exclude from further analysis, all participants who did not score 7 and above on the Lie scale. Further analysis done involved:

- Frequency analysis for a general understanding of the gender characteristics of the respondents, the characteristics and percentages of respondents across IA levels, respondents weekly internet use, respondents' perceptions on negative outcomes, reasons for internet use, hypersexual addiction, and problem video game playing.
- Linear regression analysis; to examine how each of the independent variables – 'negative outcomes', 'mainly intrinsic reasons for internet use', 'offline behavioural addictions', gender and average time spent per week on internet use predict IA.
- Independent *T*-test; to estimate the level of significant difference in gender between male and female addicts who use the internet mainly for intrinsic reasons, and not addicted to offline behavioural addictions.
- Correlation; to examine the level of significant relationship between 'average time spent per week on internet use' and adolescents' IA levels.
- Multiple regression; to find out the combined effect of the predictor-factors ('mainly intrinsic reasons for internet use', 'offline behavioural addictions', gender and 'average time spent per week on internet use') on adolescents' IA.

## 4. Results

The IA scores of the respondents ranged from 20 (0.7%) to 88 (0.2%). Highest percentage of respondents who scored the same mark (35) was 5%. Majority of the internet users (76.4%) fall into the normal users' category, whereas 20.3% were at risk of IA (at-risk group) and were thus moderately addicted to internet use. Only 3.3% had developed severe addiction to the use of internet, and thus fell into the addicts' group. Non-users of the internet were not found amongst the respondents. Table 1 reveals that normal users' IA level is made up of more females (190/83%) than males (151/69.3%). The at-risk and addicts' groups (moderate and severe addictions' levels) are both dominated by males when compared to females; at-risk group (56/25.7% males and 35/15.3% females), and addicts' group (11/5% males and 4/1.7% females). Thus, among the severe internet addicted adolescents, the number of males are almost thrice as that of females.

Table 2 presents the coefficients for 'negative outcomes' and IA levels. Results on Hypothesis 1 show the correlation coefficient 0.847 ( $p < 0.005$ ). This value of  $r$  suggests a strong positive linear correlation since the value is positive and close to +1. Thus, there exists a strong and positive linear relationship between 'negative outcomes' and IA levels of adolescents. More so, the coefficient of determination ( $r^2$ ) is 0.718, and this implies that about 71.8% of the variation in adolescents' IA levels data is explained by the adverse effects they are experiencing due to internet use ('negative outcomes'). From the coefficients' output, test statistic shows from the *T*-test method that:  $T = 34.085$ , and  $p$ -value = 0.000. And since  $p$ -value = 0.000 < 0.05, the null hypothesis was rejected.

**Table 1**  
Adolescents IA levels with respect to gender.

Gender	IA levels	Frequency	Percent	Valid percent	Cumulative percent
Male	Valid	Normal users	151	69.3	69.3
		At-risk group (moderate addiction)	56	25.7	95.0
		Addicts' group (severe addiction)	11	5.0	100.0
		Total	218	100.0	100.0
Female	Valid	Normal users	190	83.0	83.0
		At-risk group (moderate addiction)	35	15.3	98.3
		Addicts' group (severe addiction)	4	1.7	100.0
		Total	229	100.0	100.0

**Table 2**  
Coefficients result for 'negative outcomes' and a levels, 'mainly intrinsic reasons for internet use' and addicts IA, 'offline behavioural addictions and IA of addicts who use the internet, and gender and IA of addicts.

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.	95.0% Confidence interval for B	
	B	Std. error	Beta			Lower bound	Upper bound
A (constant) Those having adverse effects due to internet use	-.142	.043		-3.288	.001	-.288	-.057
	.034	.001	.847	34.085	.000	.032	.036
B (constant) Those who use the internet mainly for intrinsic reasons	63.808	12.106		5.271	.006	30.195	97.420
	1.481	1.608	.418	.921	.409	-2.984	5.946
C (constant) Respondents' scores on addiction to any or both of hypersexual and PVP	76.000	4.359		17.436	.003	57.245	94.755
	-1.000	1.155	-0.522	-0.866	.478	-5.968	3.968
D (constant) Gender	75.364	1.355		55.620	.000	72.436	78.291
	-2.364	2.624	-.242	-.901	.384	-8.032	3.305

Majority of males and females who were not internet addicts used the internet mainly for intrinsic reasons, while majority of those who were internet addicts used the internet mainly for extrinsic reasons. Most male non-addicts (8.2%) whose reasons for internet use was mainly intrinsic, go online to download things, followed by others (7.2%) who used the internet to get hobby information and some others (5.8%) who play games, while still some (5.8%) go online for sex-oriented materials. 'To meet new people' was favoured least by male non-addicts. Most female non-addicts (9.3%) play games, with others (8%) focusing on downloading things and some others (7.1%) use the internet to get hobby information. Least performed by female non-addicts was to visit chat-rooms so as to have fun. However, most male addicts (18.2%) who used the internet for intrinsic reasons do so to get sex-oriented materials, others (9.1%) going online to influence others, with some (9.1%) focusing onto download things, while yet there were others (9.1%) who go online to listen to music. And a female addict (25%) who used the internet mainly for an intrinsic reason, only downloads things when online.

Moreover, there were those who used the internet for mainly extrinsic reasons. Most male non-addicts (5.8%) who were extrinsic internet users, used the medium for doing work duties, with others (5.3%) going online to make money, and some (4.3%) using the internet to manage finances and yet others (4.3%) going online for the sake of communicating on important matters. Getting educational information and product information were activities least performed by these males. Meanwhile, most female non-addicts (6.2%) go online to make money, some others (6.2%) to communicate with their fiancé, and some (5.8%) to carry out advertisements. These females who use the internet mainly for extrinsic reasons used the medium least for doing school work. However, most male addicts (36.4%) who use the internet for gaining monetary rewards and benefits did so to communicate on important matters, with others (9.1%) showing interest in finance management, and some as well (9.1%) going online to do work duties. Whereas, two females addicts (50%) who were extrinsic internet users, only primarily go online to make money.

Table 2 also presents the coefficients result for 'mainly intrinsic reasons for internet use' and IA of adolescents who were addicts. Results on Hypothesis 2 indicated that the correlation coefficient is 0.418. This value of  $r$  suggests a fairly strong positive linear correlation. The model summary's result for 'mainly intrinsic reasons for internet use' and IA of adolescents who are addicts showed that the coefficient of determination ( $r^2$ ) is 0.175, only about 17.5% of the variability in addicts' IA data being explained by the intrinsic reasons for which they mainly use the internet. Test statistic indicates (using the  $T$ -test method) that:  $T = 0.921$ , and  $p$ -value = 0.409. Therefore with the  $p$ -value = 0.409 ( $>0.05$ ), the null hypothesis is not rejected.

In addition, Table 2 reveals the coefficients' result for 'offline behavioural addictions' and IA of addicts who use the internet mainly for intrinsic reasons. Results on Hypothesis 3 indicated that the correlation coefficient is  $-0.522$ . This value of  $r$  suggests a fairly strong negative linear correlation. Model summary's result for 'offline behavioural addictions' and IA of addicts who mainly use the internet for intrinsic reasons, showed a coefficient of determination ( $r^2$ ) value of 0.273; only about 27.3% of the variability in the IA data of addicts who use the internet mainly for intrinsic reasons is explained by offline behavioural addictions (hypersexual addiction and problem video game playing). From the result, test statistic indicates (using the  $T$ -test method) that:  $T = -0.866$ , and  $p$ -value = 0.478. Therefore with the  $p$ -value = 0.478 ( $>0.05$ ), the null hypothesis is not rejected.

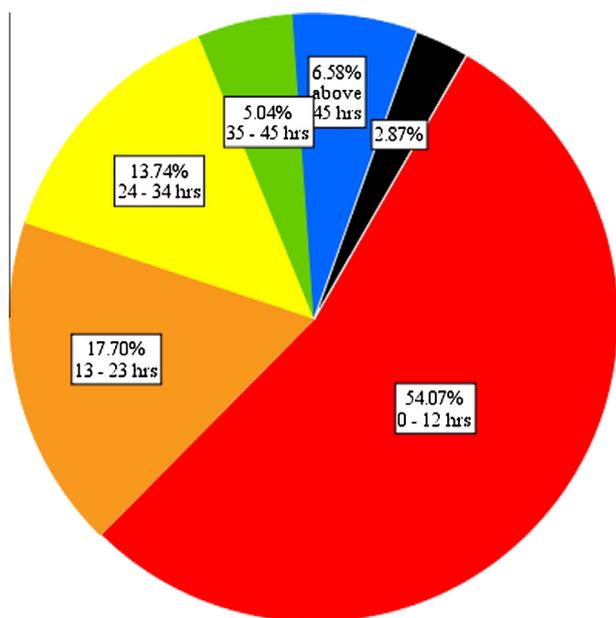
Independent samples' analysis for Hypothesis 4 produced no result. Only 1.3% internet addicted adolescents out of 3.3% addicts used the internet mainly for intrinsic reasons. Out of these 1.3% adolescents, 0.2% (one) is an addict to video game playing which is one of the offline addictions, while none is a hypersexual addict. Additionally, 0.7% addicts who use the internet mainly for intrinsic reasons are addicts to both offline video game playing and offline sex (offline behavioural addictions), thus, bringing the total of offline behavioural addicts who use the internet mainly for intrinsic reasons to 0.9%. However, addicted adolescents who use the internet mainly for intrinsic reasons were offline behavioural addicts, since statistics pin-point that there is none of them that is not addicted to offline behavioural addictions. Nonetheless, 0.4% of addicts who use the internet mainly for intrinsic reasons were excluded (missing) from the result possibly due to incomplete responses on the variables - 'hypersexual addiction' and 'problem video game playing'. Thus, the absence of an addict/addicts who use(s) the internet mainly for intrinsic reasons and not addicted to the offline behaviours (sex and video game playing) automatically means no result will be generated on Hypotheses 5 and 6.

Table 2 presents the correlation result between the variables - gender and IA of adolescent-addicts. Output on Hypothesis 5 indicated a coefficient of correlation ( $r$ ) value of  $-0.242$ . This value of  $r$  indicates a weak negative linear correlation. Model summary's result for gender and IA of addicts shows a coefficient of determination ( $r^2$ ) value of 0.059; gender only explained 5.9% of the variation in IA data of student-addicts. Using the  $T$ -test method,  $T = -0.901$ , and  $p$ -value = 0.384. Therefore with the  $p$ -value = 0.384 ( $>0.05$ ), the null hypothesis is 'not rejected'.

Table 3 and Fig. 1 present the characteristics and distribution of average time (in hours) respondents spend per week on internet use. The weekly duration of internet use among the respondents ranged from less than or equal to 12 h per week (54.07%), to more than 45 h per week (6.58%). More than half the number of respondents (252/54.07%) use the internet for 0 to 12 h per week, with

**Table 3**  
Average time spent per week on internet use.

Average time spent per week online	No. of resps.
0–12 h	252
Total	440
13–23 h	80
Total	132
24–34 h	62
Total	119
35–45 h	22
Total	33
Above 45 h	28
Total	41
Average time not specified	14
Total	25



**Fig. 1.** Respondents' % distribution of ave. time spent per week online.

the least number of respondents (22/5.04%) using the medium for 35–45 h weekly. Only 80 (17.70%) respondents accounted for weekly internet use of 13–23 h, and 62 (13.74%) accounting for 24–34 h of weekly use. Additionally, there were more males in the at-risk group who use the internet for 35–45 h (7.1%) and above 45 h (7.1%), compared to females (2.9% for 35–45 h and 2.9% for above 45 h). In the addicts' group, males significantly use the medium above 45 h per week (27.3%) with no female using the medium at this duration. However, females 95.0% use the internet for 35–45 h per week more than males (36.4%). Analysis of Hypothesis 6 produced no result.

Table 4 presents the correlation result between the variables – 'average time spent per week on internet use' and IA levels of adolescents. Result on Hypothesis 7 showed that there was a significant positive correlation between 'average time spent per week on internet use' and IA levels of adolescents ( $r = 0.235$ ,  $p < 0.0005$ , two-tailed); thus, the null hypothesis was rejected. This result shows a weak correlation: 5.5% of the variation was explained.

Table 5 relays result on the predictor variables entered into the model while Table 6 presents the result of the multiple regression between the independent variables (mainly intrinsic reasons for internet use, offline behavioural addiction, gender, and average

**Table 4**  
Correlation result on 'average time spent per week on internet use' and adolescents' IA levels.

		The average time I spend online in a week is	Respondents internet addiction levels
The average time I spend online in a week is	Pearson correlation	1	.235 <sup>a</sup>
	Sig. (2-tailed)		.000
	N	444	444
Respondents internet addiction levels	Pearson correlation	.235 <sup>a</sup>	1
	Sig. (2-tailed)	.000	
	N	444	458

<sup>a</sup> Correlation is significant at the 0.01 level (2-tailed).

**Table 5**  
Unstandardized and standardized regression coefficients for the variables entered into the model.

Variable	B	SEB	$\beta$
Those who use the internet mainly for intrinsic reasons	0.37	0.34	0.08
Respondents' scores on addiction to any or both of hypersexual and PVP	8.22	1.56	0.37
Gender	0.41	1.69	0.02
The average time I spend online in a week is	1.70	0.69	0.17

**Table 6**  
Multiple regression result reporting overall significance of the model.

Model	Sum of squares	df	Mean square	F	Sig.
Regression	5575.581	4	1393.895	12.046	.000 <sup>a</sup>
Residual	20134.855	174	115.718		
Total	25710.436	178			

<sup>a</sup> Shows that the model is significant at the 0.01 level.

time spent per week online). Using the enter method on Hypothesis 8, a significant model emerged:  $F(4,174) = 12.046$ ,  $p < 0.001$ . Regression equation for this relationship is given the expression:

$IA = 16.72 + (0.37) \text{ MNIntrinsicResns} + (8.22) \text{ OfInBehvAdd} + (0.41) \text{ Gend} + (1.70) \text{ AveTimOnli}$ . The models explains 19.9% of the variance (Adjusted  $R^2 = 0.199$ ). Only 'offline behavioural addictions' was the significant predictor, while the other factors were not. Thus, evidence here supports that the null hypothesis is rejected.

**5. Discussion**

*5.1. Negative outcomes and IA levels*

Negative outcomes are otherwise known as IA symptoms. Thus, there is a major consent that this factor (consisting of six sub-factors) is a good measure for predicting IA (Armstrong et al., 2000, as cited in Munoz-Rivas et al. (2010)), and therefore its levels. Result of this hypothesis test agrees with the fact that negative outcomes or adverse effects of internet use truly predict who is actually addicted to internet use. However, the pattern-effect of this factor to distinguish amongst normal internet users, moderate internet addicts and severe addicts to/on the internet cannot be wholly perceived without examining its component factors.

This finding when examined from the descriptive perspective lends hand to the significance of this result. The responses on

the component-factors are in-line with this finding. Higher percentages of adolescents in the addicts IA level when compared to other IA levels/groups were intensely experiencing preoccupation with thoughts of internet use (salience), staying for long time on internet use (excessive use), suffering of their school/academic work (neglect of academic work), a craving to go online when off-line (anticipation), failure after trying to reduce internet use (lack of control), and preference for internet use to associating with friends (neglect of social life). These effects showed to be lower with adolescents in the moderate addicts' IA level, and least with the normal users IA level/group.

Mythily et al. (2008) and Liu et al. (2010) surveyed students in Singapore and China. Both found that 'salience' was an addictive internet behaviour exhibited by addicts, as the current finding indicates. Frangos et al. (2010) in their findings on estimating the prevalence rate of IA amongst students in Greek University, they came up with the supportive evidence that addicts exhibited computer/internet use excessiveness, and Christakis et al. (2011) in their examination of IA in US college students also came up with similar result that most students admitted using the internet above the time they wanted.

The influence exerted by neglect of academic work in this finding is also attested to in the studies – Mythily et al. (2008), Young (2007), Liu et al. (2010), Frangos et al. (2010), Azim et al. (2009), and Isiklar et al. (2011). These studies reported from their findings that adolescents who are excessive internet users admitted that their scores and class assignments nearly declined all the time due to internet use. More so, Munoz-Rivas et al. (2010) supported the current finding that excessive internet users in their study felt the desire to use the internet when they are offline (anticipation). Another potential evidence comes from the studies of Young (2007) and Munoz-Rivas et al. (2010), whose studies discovered that addicts tried more than once to control their use of the internet but failed (lack of control). The current finding also finds support from the study of Mythily et al. (2008) whose analysis of 2735 surveyed students reported that excessive internet users were more likely to be involved in social life in lower degrees, and that addicts derive maximum social support from using the internet. It is equally clear from the findings of this study that majority of the adolescents in the addicts' IA level are experiencing the symptoms of excessive use and anticipation more than other symptoms and other adolescents in other IA levels. This indication and the results of this study also points out that a large number of adolescents are experiencing problems as a result of internet use when an examination of the population of adolescents in the at-risk IA level and addicts' level is done.

### 5.2. Mainly intrinsic reasons for internet use and IA

This study shows that using the internet mainly for intrinsic reasons does not predict IA among addicts. Although from the findings most of the male addicts who use the internet mainly for pleasure seeking do so by going for sex-oriented materials, while the only female addict who uses the internet for personal pleasure carries out downloading activity when online. The number of males who are mainly extrinsic internet users supersedes the mainly intrinsic users, and so no significant prediction is obtained.

This finding seems contrary to Fisoun et al.'s (2012) result, whose finding revealed that the possibility exist for males with greater addiction to use the internet for personal satisfaction (stimulated by the appealing or sexual nature of the web application(s)), and females favouring social communication. Another contrary finding is that of Canbaz et al. (2009) who investigated the prevalence of IA among adolescents, in relation to different internet activities, and they reported that online behaviours most performed were interactive gaming, sourcing for information and

chatting. However, this study discovered that major activities performed by mainly intrinsic internet users did not include game playing, and moreover that chatting was least favoured by female non-addicts.

Furthermore, fewer males were addicted to sex-oriented materials compared to others who use the internet to communicate on important matters, and whereas female addiction was not inclined to chatting and internet auctions' use. This contradicts Young (2007) finding that mentioned internet sexual activities, gambling and gaming behaviours as activities which mostly predict men's addiction, whereas women's addiction is majorly inclined to internet chatting and use of internet auctions. These findings and that from this study suggest that it could be socio-economic factors that determine the most popular internet activities that young people flow with. Thus, Young's findings suggest that chatting is highly engaged in by majority of women, and internet pornography by men. However, this study revealed that adolescents' online needs may have been gradually replaced by the prevailing socio-economic conditions, making lesser number to seek pleasurable activities while majority seeks benefits with monetary value and activities that bring personal rewards.

### 5.3. Offline behavioural addictions and IA

Among addicts whose use of the internet is mainly directed towards deriving personal pleasure, this study found that offline behavioural addictions did not significantly predict IA. This finding counters the suggestion that there is evidence that a significant relationship exist between increase in IA and offline behavioural activities of males and females (Fisoun et al., 2012), and the observational explanation of Frangos et al. (2010), which brings to light that men's online use centers more on sexual satisfaction and high involvement in internet gaming when compared to women's internet use. The result is also far from supporting the studies (Canbaz et al., 2009; Fisoun et al., 2012; Young, 2007) that suggested that online pornography and gaming addictions account for high addiction level amongst addicts. However, the inability of this factor to significantly predict IA does not imply that it does not contribute to an adolescent's IA level. Its failure to directly and effectively predict an addict could be a suggestion that this factor cannot stand alone, but may better act as an intervening factor.

### 5.4. Gender and IA

Findings showed that gender is not a significant predictor of IA among addicts. This contrasts that of Frangos et al. (2010) who implied that male gender is a moderate predictor of IA. However, another finding from this study shows that male-addicts are more in number (almost thrice) compared to female addicts. This pattern is consistent with existing literature. In the study carried out by Azim et al., it was found that observable negative effects marked greater number of online users who were males, whereas a greater proportion of females were moderate online users. This study rather discovered that a far greater proportion of females are normal online users. More so, the studies Frangos et al. (2010), Mythily et al. (2008), Serin (2011), Canbaz et al. (2009), Fisoun et al. (2012), Odaci and Kalkan (2010), Ko et al. (2008), Sepehrian and Lof (2011b), and Chakraborty et al. (2010) found and suggested that males suffer more from IA than females. However the result of Hardie and Tee (2007) contrasts this in that they observed that IA was evenly engaged-in by both males and females. The small involvement of the female gender in intense online activities supports the evidence that females are late adopters of technology (ECAR, 2010).

### 5.5. Average time spent per week on internet use and IA levels

Another finding from this study is that the average time adolescents spend per week on internet use is significantly correlated with IA levels in which they can be categorized. [Odaci and Kalkan \(2010\)](#) investigated IA among 493 accidentally sampled young adult students in Education faculty, Karadeniz Technical University, and examined its correlation to loneliness and dating anxiety. Their study found that users who spend above 5 h daily on the internet showed significant symptom of excessive internet use compared to those who use the medium for less than 5 h daily. This evidence supports the finding in this study, in that it was discovered that addicts use the internet for an average per week of 35–45 h, and some even use the medium for above 45 h per week (all males). Those who use the internet less than 35–45 h per week were quite randomly distributed, though a pattern is observed with an increase from the normal users to the severe addiction group.

### 5.6. Mainly intrinsic reasons for internet use, offline behavioural addictions, gender and average time spent per week on internet use and IA

This study discovered that mainly intrinsic reasons for internet use, offline behavioural addictions, gender and average time spent per week on internet use are significant predictors of IA. However the result indicates that only offline behavioural addictions significantly predicted IA. This supports the evidence that a significant relationship exist between increase in IA and offline behavioural activities of males and females ([Fisoun et al., 2012](#)). It equally lends weight to the observatory explanation of [Frangos et al. \(2010\)](#), which brings to light that men's online use centers more on sexual satisfaction and high involvement in internet gaming when compared to women's internet use. The finding also confirms those from previous studies ([Canbaz et al., 2009](#); [Fisoun et al., 2012](#); [Young, 2007](#)) that suggested that online pornography and gaming addictions account for high addiction level amongst addicts.

Hypersexual and video game playing addictions were found in this study among addicts, and male intrinsic internet addicts were also observed to be going online for sex-oriented materials. However, this result additionally pin-points that offline behavioural addiction as a factor acts as an intervening condition in the model of prediction. Thus, it cannot on its own be used as a measuring variable without a combination of other factors or determinants of IA.

### 5.7. Limitations

This study's final selected sample placed some impositions on obtaining a detailed result on two hypotheses. And although a stratified random sample was used, descriptive and IA patterns across each stratum were not considered, making this study more an exploratory research.

## 6. Conclusions

The findings from this study suggest the conclusion that there is prevalence of IA among the adolescent population. The prevalence rate is 3.3% in a male to female ratio of almost 3:1. The at-risk population is quite high and calls for concern. Adolescents' online addiction is mainly influenced by extrinsic reasons for internet use, although there are few whose reasons for going online were mainly intrinsic based. Using the internet to communicate on important matters, getting sex-oriented materials, and making money (especially amongst females) seems to dominate addicts'

minds. This result thus suggests that most young adults who use the internet to the level of addiction may have been incited into this internet behavioural state by some socio-economic factor(s).

However, certainty of offline behavioural addictions playing a key role in adolescents' IA is also clear. This suggests that majority of these young adults are 'addicts on the internet' and not 'addicts to the internet'. However, inconclusive results on two hypotheses leave an open possibility that there seems to be a set of 'addicts to the internet', whose reasons for internet use were mainly for pleasure and were not addicted to offline behavioural addictions. Thus, it can be stated that offline behavioural addictions is not an IA causal factor but rather a motivating factor among the adolescent population, result clearly suggesting that IA could highly be a distinct disorder being experienced by internet addicts but fuelled by offline behavioural addictions, while intrinsic reasons for internet use cannot serve as a reliable factor for distinguishing addicts from non-addicts. Meanwhile, 'negative outcomes' remain the strongest and most viable factor for confirming Internet addiction amongst the adolescent population.

The limitations to this study need re-examining for further improvement. First, more samples need to be drawn from diverse geographical locations and cultures. This will yield results that will give understanding of IA on a wider perspective. A larger population is necessary for Internet addiction survey studies; this will clear the doubt of whether there exists 'addicts to the internet.' Being more of an exploratory research limits this study from the understanding of patterns that exist across academic levels, which could be a useful insight to understanding IA trends among adolescents. And in the research atmosphere, focus should be greatly placed on qualitative approaches to studying IA, to enable a deeper understanding of IA causal factors and synthesis of a unified and embracing model for IA.

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