



## Research Article

# Internet Addiction Among KNUST School of Medical Sciences and Dentistry (KSMD) Students - A Preliminary Study in Ghana.

## ABSTRACT

The rising rate of internet accessibility has brought with it an attendant challenge of Internet Addiction (IA). This study assessed the level of IA and its relationships to loneliness, self-esteem, and satisfaction with life focusing on students of the Kwame Nkrumah University of Science and Technology School of Medical Sciences (KSMD) Kumasi, Ghana. The cross-sectional survey method was used with 122 students conveniently sampled from KSMD. From the findings, no severe internet addiction was found, however, 9.84 % and 41.80 % scored in the moderate and mild internet addiction ranges respectively. The results also indicated a weak positive correlation between internet addiction and loneliness, self-esteem and a weak negative but highly significant association with satisfaction with life. While severe IA is not yet a serious problem, 9.83 and 41.3% of the study population suffered from moderate and mild IA respectively and stood the risk of progressing to the severe end of the IA continuum. Counseling was therefore recommended for students to master control over their internet usage.

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## INTRODUCTION

The internet has become the most recognized and popular channel for communication<sup>2</sup> commerce, social media, information, academic research and entertainment.<sup>3</sup> In recent years internet usage has increased amongst Ghanaians.<sup>4</sup> Reports from the Miniwatts Marketing Group in 2019, indicated that 10,110,000 Ghanaians, representing 35% of the population of 29,150,000 people currently use the internet and this figure represents an increase of two million on the figures recorded in January 2017.<sup>5</sup> Their research further estimated that as at 30<sup>th</sup> June 2019, 11,737,818 Ghanaian use the internet. This represents an internet penetration rate of 39.0% in Ghana at a growth rate of 39.026% over its figures obtained in the year 2000.

The use of the internet has however been recognized as a powerful influence on the daily lives of mankind

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<sup>2</sup> Masud, Muhammad Mehedi, Selim Ahmed, Mahfuzur Rahman, and Rulia Akhtar, “Measuring Psychological Effects and Internet Addiction towards Academic Performance of Tertiary Students in Malaysia.” *International Journal of Research in Business and Technology* 9, no. 1 (2016). <https://doi.org/10.17722/ijrbt.v9i1.465>.

<sup>3</sup> R. M. A. Chamika, and Shavindra R. Dias. “Relationship of Internet Addiction with Depression, Loneliness and Health Related Lifestyle among University Students.” *Journal of Health Science* 6, no. 4 (2018): 310–15. <https://doi.org/10.17265/2328-7136/2018.04.010>.

<sup>4</sup> Kweku Zurek, “An Annual Report Released by Global Digital Agencies.” Graphic online, <https://www.graphic.com.gh/news/general-news/over-10-million-ghanaians-using-the-internet-report.html>

<sup>5</sup> Miniwatts Marketing Group, “Internet World Stats – Usage and Population Statistics.”

due to the wealth of information available online and technological advances of the contemporary world.<sup>6</sup> Reports have shown that, even though internet has brought enormous benefit to the youth's education, it has been linked with an undesirable consequence on their mental health – the most obvious being internet addiction<sup>7</sup> stemming from the excessive, and dependence on its usage.<sup>8</sup> Internet Addiction (IA) was initially referred to as pathological internet use<sup>9</sup> and a problematic internet use.<sup>10</sup> IA has been difficult to define, however, several inputs as to the symptoms to include in its definitions have been made. IA pioneer Young and her colleagues revised the criteria for diagnosing pathological gambling or impulse control disorders to make a diagnosis of IA.<sup>11</sup> They suggested important criteria to include preoccupation with the Internet, spending too much time on the Internet, failed efforts to quit, irritability when trying to cut back, endangering important relations to be online, dishonestly concealing Internet use, and using it as a means of evading problems.<sup>12</sup> Summaries from findings of various studies, cite a whole myriad of undesirable biopsychosocial consequences, which include "...depression, anxiety, hostility, inter-personal sensitivity, psychoticism, psychosomatic symptoms, lack of physical energy, physiological dysfunction, weakened immunity, emotional symptoms, behavioral symptoms, and social adaptation problems..."<sup>13</sup>

Also in terms of social impact, internet is gradually reducing the addicts'/users' local social networking and involvement evidenced by reduced communication within families, increases in loneliness and depression among others.<sup>14</sup> According to Northrup et al, four signs and symptoms essential for the diagnosis of IA which are; (1) excessive usage of the Internet (particularly when judged by time loss and/ or neglecting one's social roles); (2) symptoms of withdrawal such as depression or irritability when the Internet is unreachable and (3) increased tolerance evidenced by the desire for increasing the use of the internet to deal with adverse emotional symptoms.<sup>15</sup> The fourth symptom they suggested for diagnosing IA was the undesirable consequences, such as quarrels with significant others, becoming deceitful and dishonest, exhaustion leading to reduced performance in terms of schooling or work as well as social isolation. From the above suggestion, the authors attempt a simple definition of IA as a behavioral addiction characterized by uncontrollable preoccupation and excessive use of the internet, associated with the experience of negative emotional symptoms such as irritability, moodiness, nervousness, boredom when the internet is unavailable, uncontrollable need for more time online at the expense of important social relations and occupational functioning. There is evidence to suggest that the outcome of the compulsive internet rituals, e.g., compulsive online video-game-playing, and watching of pornographic materials cause changes in brain dopamine pathways and other neural structures analogous to those of biochemical addictions.<sup>16</sup> In terms of demographics, researchers have recognized young people as the most internet-dependent users and in terms of specifics and to be the most vulnerable group for problematic internet as compared to adults. and comparatively more common among university students.<sup>17</sup> This can lead to mediocre educational performance.<sup>18</sup>

<sup>6</sup> Masud et.al Measuring Psychological Effects.

<sup>7</sup> Callista U Nduanya, Friday E Okwaraji, Godwin C Onyebueke, and Kenechukwu I Obiechina. "A Cross Sectional Study on Internet Addiction, Locus of Control and Psychological Distress in a Sample of Nigerian Undergraduates." *The Journal of Medical Research* 4, no. 3 (2018): 146–50. <https://doi.org/10.31254/jmr.2018.4308>.

<sup>8</sup> K., Kim, E Ryu,., M. Y Chon,., E. J.Yeun, , S. Y.Choi, , J. S. Seo, , & Nam, "Internet Addiction in Korean Adolescents and Its Relation to Depression and Suicidal Ideation: A Questionnaire Survey." *International Journal of Nursing Studies* 43, no. 2 (2006): 185-192

<sup>9</sup> Sally Pui, Man Law, and Kit Chang, "Factor Structure for the Internet Addiction Test: A Confirmatory Approach." it is important that we have a better understanding of the structure, validity, and reliability of the assessment instruments. Thus, the current study attempts to evaluate the Internet Addiction Test (IAT) *International DSI / Asia and Pacific DSI*, 2007, 1–12.

<sup>10</sup> Ibid. See also Demetrovics, Zsolt, et al, "Psychometric Properties of the Problematic Internet Use Questionnaire Short-Form (PIUQ-SF-6) in a Nationally Representative Sample of Adolescents." *PLoS ONE* 11, no. 8 (2016): 1–12. <https://doi.org/10.1371/journal.pone.0159409>;

<sup>11</sup> Mark D. Griffiths, Daria J. Kuss, Joël Billieux, and Halley M. Pontes. "The Evolution of Internet Addiction: A Global Perspective"; Young, "Internet Addiction: The Emergence of a New Clinical Disorder." *Addictive Behaviors* 53 (2016): 193–95. <https://doi.org/10.1016/j.addbeh.2015.11.001>.

<sup>12</sup> Jason C. Northrup, Coady Lapierre, Jeffrey Kirk, and Cosette Rae. "The Internet Process Addiction Test: Screening for Addictions to Processes Facilitated by the Internet." *Behavioral Sciences* 5, no. 3 (2015): 341–52. <https://doi.org/10.3390/bs5030341>

<sup>13</sup> Mainul Haque et al, "Internet Use and Addiction among Medical Students of Universiti Sultan Zainal Abidin, Malaysia." *Psychology Research and Behavior Management* 9 (2016): 297–307. <https://doi.org/10.2147/PRBM.S119275>.

<sup>14</sup> Chamika and Dias, "Relationship of Internet Addiction with Depression"; Kraut, R., Patterson et al, "Internet Paradox: A Social Technology That Reduces Social Involvement and Psychological Well-Being?." *American Psychologist* 53, no. 9 (1998): 1017.

<sup>15</sup> Northrup et al. "The Internet Process Addiction Test"

<sup>16</sup> D.H Han, Y.S. Kim, Y.S Lee, K.J Min, P.F Renshaw, "Changes in Cue-Induced, Prefrontal Cortex Activity with Video-Game Play." *Cyberpsychol. Behaviour. Social. Network* 13 (2010): 655–661.

<sup>17</sup> Nduanya et al., "A Cross Sectional Study on Internet Addiction"; Thatcher A, Goolman "Defining the South African Internet Addict: Prevalence and Biographical Profiling of Problematic Internet Users in South Africa." *African Journal of Psychology* 35, no. 4 (2005): 766-792.;

<sup>18</sup> Masud et.al Measuring Psychological Effects.

## RELATED WORK

The overall worldwide picture of the incidence of Internet addiction is one of the diverse and complex scenarios, revealing a wide range of rates, from 1% to 25%<sup>19</sup> or up to 38% in some general populations in parts of the world.<sup>20</sup> Thus, there appears to be inconsistent IA prevalence rates across different cultures across the globe attributable to a lack of standardized criteria and different research approaches in different ethnic cultures across the world.<sup>21</sup> For example, Uddin et al found that scores on Young's Internet Addiction Test (IAT) among Bangladeshi undergraduate put 47.7% males and 44.5% female students (out of 475 students selected from five universities) within the severe Internet addiction range.<sup>22</sup> This was followed by 27.1% males and 33.9% females scoring within moderate range, with a further 20.7% males and 7.7% females scoring within the mild Internet addiction ranges. Also employing descriptive-analytic correlation with 408 Iranian undergraduates (150 females and 258 males) from Birjand Islamic Azad University carefully chosen through cluster method of sampling and using Cooper Smith Self-Esteem Inventory (CSEI), Beck Depression Inventory (BDI), and Young's Internet Addiction Test (IAT), Bahrainian and associates found as high as 40.7% scoring in internet addiction range and a significant relationship between depression, low self-esteem and internet addiction.<sup>23</sup> Also in Iran, a recent cross-sectional research by Salarvand et al found 10% internet addiction rate among 160 Iranian students with a significant adverse relation between internet addiction and Rosenberg's self-esteem score as well as with life satisfaction score.<sup>24</sup>

A review of over 100 studies by Wallace showed over 12% males and 5% female students in China experienced severe Internet addiction.<sup>25</sup> Using Pawlikowski's s-IAT for Internet addiction designated as "Internet Use Disorder" (IUD), the short version of Kwon's Smartphone Addiction Scale for "Smartphone Use disorder" (SUD), Interpersonal Reactivity Index (IRI) for "empathy" and items from the Socio-Economic Panel, Germany (SOEP) - Questionnaire for "Life satisfaction", in a recent replicative dual cultural research made a noteworthy discovery about IA and its relationships with selected psychological variables.<sup>26</sup> These include: a substantial inverse association between IUD, empathy and life satisfaction; an inverse association among Smartphone use disorder (SUD) in only Chinese samples, and, a positive association between personal distress and SUD in both samples. The authors explained this as a manifestation of a higher stress susceptibility in social interaction which often placed participants at a heightened risk of developing smartphone use disorder (SUD).

In another cross – sectional survey aimed at establishing the relationship of Internet Addiction (I.A) and depression, loneliness and health related lifestyles among 175 Allied Health Sciences students of the University of Peradeniya; a state university in Sri Lanka, also found 28.6% and 12.0% of students respectively scoring within the mild and moderate addiction ranges, with no participant scoring within severe addiction ranges.<sup>27</sup> Moreover they found a significant positive correlation between internet addiction (I.A.) and both depression and loneliness, and a significant negative correlation between internet addiction and health related lifestyle with male participants having higher I.A scores than females. Another cross-sectional study among 149 University of Sultan Zainal Abidin Medical Students in the state of Terengganu in Malaysia, found 44.9% males and 41.4% females scored within mild internet addiction ranges.<sup>28</sup> In an earlier research Kapahi et al, had adopted similar research approach, and had found 29% of 203 Malaysian high school youth were at risk of (IA).<sup>29</sup> Also in the same country, Masud et al administered internet addiction survey questionnaire to 220 respondents from five universities and established that 6.3 % of males and 3.2 % of females were internet abusers. Additional results from Structural Equational Modeling (SEM) revealed that (IA) had a significant negative influence on their academic performance.<sup>30</sup>

<sup>19</sup> R. Perrella, & Caviglia, "Internet Addiction. Adolescent and Adults."; Eugenia Treglia, and Rosella Tomassoni. "Technological Use Behaviors, Internet Addiction and Personality among Italian University Students." *Psychology* 09, no. 03 (2018): 472–84. <https://doi.org/10.4236/psych.2018.93029>.

<sup>20</sup> C.Gregory, INSERT THE TITLE OF THE ARTICLE "Https://www.Psycom.Net/Iadcriteria."

<sup>21</sup> Ibid.

<sup>22</sup> Sahab Uddin et al., "Internet Addiction Disorder and Its Pathogenicity to Psychological Distress and Depression among University Students: A Cross-Sectional Pilot Study in Bangladesh." *Psychology* 07, no. 08 (2016): 1126–37. <https://doi.org/10.4236/psych.2016.78113>

<sup>23</sup> Bahrainian et al., "Relationship of Internet Addiction with Self-Esteem and Depression in University Students."

<sup>24</sup> Shahin Salarvand et al., "Corrigendum to: The Prevalence of Internet Addiction and Its Relations to the Self Esteem and Life Satisfaction in Students of a Medical University" *Acta Med Iran*, 56 no. 6, (2016): 392-397.

<sup>25</sup> P. Wallace, "Internet Addiction Disorder and Youth: There Are Growing Concerns about Compulsive Online Activity and That This Could Impede Students'." *Performance and Social Lives. EMBO Reports*. 15, (n: d): 12–16.

<sup>26</sup> Bernd Lachmann et al., "The Role of Empathy and Life Satisfaction in Internet and Smartphone Use Disorder." *Frontiers in Psychology* 9, (2018): 1–11. <https://doi.org/10.3389/fpsyg.2018.00398>.

<sup>27</sup> Chamika and Dias, "Relationship of Internet Addiction with Depression"

<sup>28</sup> Ibid.

<sup>29</sup> Kapahi Ashish et al., "Internet Addiction in Malaysia Causes and Effects." *IBusiness* 05, no. 02 (2013): 72–76. <https://doi.org/10.4236/ib.2013.52009>

<sup>30</sup> Masud et al., "Measuring Psychological Effects and Internet Addiction"

On the other end of the globe, a cross cultural factor analytical research by Sebra et al on 1399 Portuguese and Brazilian internet users aged between 14 and 83 years revealed a negative association between internet addiction and Rosenberg’s self-esteem scores.<sup>31</sup> They also found mostly young Brazilian men aged between 14 – 25, was the group exhibiting the most elevated levels of internet addiction. Thus, in terms of gender, research evidence has demonstrated more males affected by IA<sup>32</sup>, as male subjects seem to be more involved in computer-generated activities such as gaming, gambling and cybernetic sex.<sup>33</sup> From the above literature the problem is increasingly becoming widespread that the youth in high schools (and universities) are being negatively affected. In West Africa few peer-reviewed articles have been published on this all-important virgin (IA) research area. For example, a cross – sectional study on IA, locus of control (LOC) and psychological distress in a Nigerian undergraduate sample,<sup>34</sup> found that 27.4%, 12.9% and 9.8% of the sample experienced respectively mild, moderate and severe I.A.<sup>35</sup> The authors noted that in terms of LOC, 69.3% and 30.7% were respectively internally and externally oriented and 24% of the sample had 24.2 psychological distress. Furthermore, their study found that the youth in universities seemed to be more susceptible to (IA) compared to other age groups of society and that 16 – 24 year respondents were the most addicted to the internet with much more emotional distress than 25 – 31 year olds.<sup>36</sup> IA has received an enormous amount of research effort around the world, especially among the youth in Asia but the same cannot be said about West Africa – especially students in Ghana – Kumasi to be precise. Thus, in Ghana IA has received little research effort. A quick google search of “Internet Addiction in Ghana” yielded mainly e- online publications, and a few academic theses in partial fulfillment of degrees but no peer - reviewed articles. This preliminary research has generally therefore been embarked upon to fill the knowledge gap on IA in Ghana.

The specific aims of the present preliminary research therefore were:

- (i) to estimate the level of Internet Addiction (IA) among KSMD students, and
- (ii) to establish relationships between IA and psychological variables such as, Satisfaction with Life, Self-esteem, Self-actualization, Loneliness etc.

## MATERIALS AND METHODS

This investigation employed a cross - sectional online survey method in finding the level of internet addiction among 122 student volunteers conveniently sampled from the entire School of Medical Sciences and Dentistry in the college of health Sciences, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana. Measures used included a questionnaire covering the socio- demographic particulars, Internet Addiction Test (IAT), Loneliness Scale, Index of Self - esteem, Satisfaction with Life and Common Belief for Students, all of which have been described in detail below. An internet link using google form was created for participants to log on and respond after going through the participants’ information sheet including assurances of confidentiality and consenting to voluntarily participate in this research. Apart from the IAT, all the measures used in this current were obtained from Corcoran and Fisher’s “Measures for Clinical Practice – A Sourcebook” New York, the Free Press, volumes 1 & 2.

## INTERNET ADDICTION TEST (IAT)

The Internet Addiction Test (IAT) is a widely used internet screening test developed by the Centre for Internet Addiction, USA. It was constructed by Dr. Kimberly Young, the director, for the measurement of Internet addiction and compulsivity. It consists of 20 questions examining IA symptoms and each answer rated on a five-point Likert scale from 0 – 5; respectively, Not applicable, Rarely, Occasionally, Frequently, Often and Always). “To date, Young’s Internet addiction test (IAT) is the most commonly used measure for the research into internet addiction”<sup>37</sup> For example, most of the IA research reviewed in this literature used IAT.<sup>38</sup> The authors chose to use IAT since it is the most commonly used and to be able to have a fair comparative idea of IA in Ghanaian youth. In the pretesting before the research the researchers obtained a Cronbach’s Alpha value of 0.859 (85.9%) for internet addiction test (IAT) which suggests a high consistency of internal construct.

<sup>31</sup> Seabra et al., “Relationship between Internet Addiction and Self-Esteem: Cross-Cultural Study in Portugal and Brazil.” *Interacting with Computers* 29, no. 5 (2017): 767–78. <https://doi.org/10.1093/iwc/iwx011>.

<sup>32</sup> S., Mei, Y. H. C. Yau, J., Chai, J. Guo, & Potenza, “Problematic Internet Use, Well-Being, Self-Esteem and Self-Control: Data from a High-School Survey in China. *Addictive Behaviors* 61 (2016): 74–79.; A., Tsitsika, et al, “Internet Addictive Behavior in Adolescence: A Cross-Sectional Study in Seven European Countries. and Social Networking.” *Cyberpsychology, Behavior* 17, no. 8 (2014): 528–535.

<sup>33</sup> J., Morahan-Martin, and P. Schumacher, “Incidence and Correlates of Pathological Internet Use among College Students” *Computers in Human Behavior* 16, no.1 (2000): 13-29 ; Treglia and Tomassoni, “Technological Use Behaviors”.

<sup>34</sup> Nduanya et al., “A Cross Sectional Study on Internet Addiction”.

<sup>35</sup> Ibid.

<sup>36</sup> Ibid.

<sup>37</sup> Masud et al., “Measuring Psychological Effects and Internet Addiction”

<sup>38</sup> Haque et al., “Internet Use and Addiction among Medical Students ”; Kapahi et al., “Internet Addiction in Malaysia Causes and Effects”; Chamika and Dias, “Relationship of Internet Addiction with Depression”; Masud et al., “Measuring Psychological Effects”; Nduanya et al., “A Cross Sectional Study on Internet Addiction”.

### **LONELINESS RATING SCALE (LRS)**

Loneliness Rating Scale (LRS) by Scalise and Ginter consists of 40 items divided into two parts namely; frequency (Part A) and intensity (Part B).<sup>39</sup> The LRS possesses an impressive psychometric properties of 0.82 to 0.89 alpha Cronbach value, six week stability test – retest reliabilities ranging from 0.61 to 0.71, 0.65 to 0.70 for frequency and intensity subscales respectively. For each of the two parts, participants are instructed to indicate which sentence best describes their loneliness experience from 4- and 5-part Likert-scales respectively. An example of a typical statement is as follows; “ \_\_\_ When I experience loneliness, I feel low (PART A) ...The feeling of being low is: \_\_\_\_ ... (PART B)” Pretesting revealed a Cronbach alpha value of 0.968 (96.8%) and 0.977 (97.7%) for parts A and B respectively. The authors chose LRS for its impressive psychometric properties and to explore whether each of its four subscales namely; depletion, isolation, agitation and dejection could contribute new knowledge. Moreover, its validity figures suggest a moderate concurrent validity with the commonly used UCLA loneliness scale.

### **INDEX OF SELF – ESTEEM (ISE)**

ISE by Hudson consists of 25 questions which assesses self-esteem problems often fundamental to socio - psychological difficulties.<sup>40</sup> Responders were instructed to quantify how they saw themselves on a Likert scale from a 5 item Likert scale of 1 (none of the time) to 5 (Most of the time) on questions such as “... I feel that people would not like me if they really knew me well...” The sourcebook reports an internal stability of a mean of alpha Cronbach of 0.93 and a two – hour test retest correlation of 0.92 <sup>41</sup> pretesting revealed 71.6% internal consistency. The authors chose to use this measure over the popular Rosenberg’s self-esteem scale because of its cut – off points, its excellent psychometric properties and because of the claim “it has a wide range of utility for a number of clinical problems” by Corcoran and Fisher, 1994 (p. 383).

### **SATISFACTION WITH LIFE SCALE (SWL)**

SWLS consists of 5 – items instrument that assesses a person’s own personal biased cognitive – judgmental evaluation of their quality of life.<sup>42</sup> With an impressive stable internal consistency of 0.87 alpha, 0.82 test – retest two – month reliability and with a high correlation with nine measures of subjective wellbeing the SWLS is regarded as one of the best key component of an individual’s mental wellbeing. It uses a 7 item Likert scale from “strongly disagree” to strongly agree” to sentences such as “In most cases my life is close to ideal”. An Alpha Cronbach value of 0.848 (84.8%) was obtained in a pretesting. SWLS has been used in numerous researches. Moreover, several studies have proven that the SWLS has satisfactory psychometric properties with internal consistency normally between Cronbach’s alpha values of 0.77 and 0.89.<sup>43</sup>

## **RESULTS**

This study was designed with two main objectives in mind, namely; to estimate the level of IA and to establish relationships between IA and psychological variables of interests listed and described above by using Statistical Package for Social Sciences (SPSS) 20 by IBM Corporation. Before then a descriptive analysis was performed on the demographic characteristics obtained from the participants and the results are as documented below.

### **DEMOGRAPHIC CHARACTERISTICS**

122 students voluntarily partook in this research and submitted their responses for analysis. A total of 72 respondents representing (59.02%) of respondents were females whereas 48 respondents (39.34%) were males. With respect to age, it was realized 80 (65.5%), 24 (19.67%) and 4 (3.7 %) of the respondents were between ages 18 - 21, 22 – 25 and 26 – 29 years respectively. All these participants were drawn from the School of Medical Sciences and Dentistry (KMSD)

<sup>39</sup> J.J. Scalise, E.J. Ginter, L.HA.Gerstein, “Multidimensional Loneliness Measure: The Loneliness Rating Scale (LRS).” *Journal of Personal Assessment* 48, no. 5 (n:d): 525-530.

<sup>40</sup> W.W.Hudson, “*The Clinical Measurement Package: A Field Manual*”: (Chicago Dorsey Press., 1982)

<sup>41</sup> Corcoran Fisher, “Measures for Clinical Practice – Volumes” (New York, The Free Press, 1 & 2: 436) :Hudson, “The Clinical Measurement Package”.

<sup>42</sup> D. E. Emmons, R. A.Larsen and R.J Griffins, “The Satisfaction with Life Scale.” *Journal of Personality Assessment* 49, 71 – 79.

<sup>43</sup> V. V.Gouveia, , T. L.Milfont, , P. N. da Fonseca, & Coelho, “Life Sat- Isfaction in Brazil: Testing the Psychometric Properties of the Satisfaction with Life Scale (SWLS) in Five Brazilian Samples. *Social Indicators Research* 90, no. 2 (2009): 267–277. <https://doi.org/doi:10.1007/s11205-008-9257-0>; W.Pavot, E. F, Diener, C.Colvin, & R.,Sandvik, “Further Validation of the Satisfaction with Life Scale: Evidence for the Cross-Method Convergence of Well- Being Measures. *Journal of Personality Assessment* 57, no. 1 (n:d): 149–161; Sachs, “Validation of the Satisfaction with Life Scale in a Sample of Hong Kong University Students”. *PSYCHOLOGIA An International Journal of Psychology in the Orient* 46, no. 4 (2003): 225–234.; Johannes Ulrich Siebert, Reinhard E. Kunz, and Phillipp Rolf, “Effects of Proactive Decision Making on Life Satisfaction. ” *European Journal of Operational Research* 280, no. 3 (2020): 1171–87. <https://doi.org/10.1016/j.ejor.2019.08.011>.

with first year students participating the most in this study; 41 (36.61%) followed by third years 29 (23.77%) and sixth years with 19 (15.57%). The rest were 4<sup>th</sup> years, second (2<sup>nd</sup>) years and fifth (5<sup>th</sup>) years with 16, 8 and 4 respondents each representing 13.11%, 6.56% and 3.28% respectively. Also, in terms of religion, majority 115 of the respondents were Christians with a percentage of 94.26%, followed by 4 Muslims with a percentage of (3%) and 2 (2%) of the respondents were either Buddhists or Atheists as shown in table 1 below.

**Table 1: Demographic Characteristics of Respondents**

Variables	Responses	Frequency	Percentage
<b>Gender</b>	Males	48	39.34
	Females	72	59.02
<b>Ages</b>	18-21	80	65.57
	22-25	24	19.67
	26-29	4	3.28
<b>Level</b>	HB 1	41	33.61
	HB 2	8	6.56
	HB 3	29	23.77
	MBC HB 1	16	13.11
	MBC HB 2	4	3.28
	MBC HB 3	19	15.57
<b>Religion</b>	Christianity	115	94.26
	Muslim	4	3.28
	Others	2	1.64

**NB:** There were missing values; therefore the total number does not add up to 122.

**RESULTS OBJECTIVES 1; STUDY PARTICIPANTS' (SPs) INTERNET ADDICTION.**

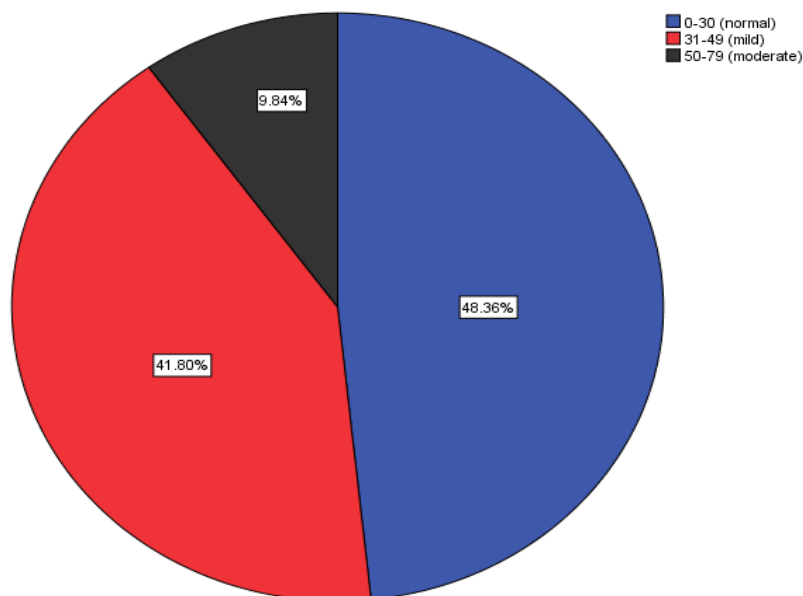
Table 2 below shows the internet score ranges obtained from the current study participants according to the score range / cut offs prescribed by the constructor of the IAT.

**Table 2: INTERNET ADDICTION SCORES**

Scores	frequency	percentage
0-30 (Normal)	59	48.36
31-49 (Mild)	51	41.80
50-79 (Moderate)	12	9.84
80-100 (Severe)	0	0.0

Source: Researcher's construct

Respondents' internet addiction scores in table 2 above have also been represented in a Pie chart



*Figure 1. A Pie Chart showing the Internet Addiction scores of Respondents*

From Figure 1 above, 59 of the respondents (48.36%) of the respondents have no problem with internet usage (i.e., normal users), whereas 41.80% are mildly addicted to the internet, implying they spend a little time on the internet usage but generally can control internet usage. Also, a total of 12 respondents (9.84 %) however indicated they spend a moderate amount of time on the internet and at the borderline, but no participant scoring within the severe internet addiction range.

**OBJECTIVE 2: RELATIONSHIPS BETWEEN IA AND PSYCHOLOGICAL VARIABLES OF INTEREST**

To achieve objective 3, a correlational analysis was performed on the variables to ascertain relationships between internet addiction and psychological variables of interest and shown in table 3 below.

**Table 3: Correlation of IA with Psychological Variables**

		IAT	SL	ISE	LS_F	LS_I
IAT	Pearson Correlation	1	-0.237**	0.173	0.051	0.087
	Sig. (2-tailed)		0.009	0.056	0.581	0.341
	N	122	122	122	122	122
SL	Pearson Correlation	-0.237**	1	-0.064	-0.094	-0.042
	Sig. (2-tailed)	0.009		0.483	0.301	0.649
	N	122	122	122	122	122
ISE	Pearson Correlation	0.173	-0.064	1	-0.051	0.035
	Sig. (2-tailed)	0.056	0.483		0.578	0.699
	N	122	122	122	122	122
LS_F	Pearson Correlation	0.051	-0.094	-0.051	1	0.554**
	Sig. (2-tailed)	0.581	0.301	0.578		0.000
	N	122	122	122	122	122
LS_I	Pearson Correlation	0.087	-0.042	0.035	0.554**	1
	Sig. (2-tailed)	0.341	0.649	0.699	0.000	
	N	122	122	122	122	122

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Where; IAT=Internet Addiction Test, SL= Satisfaction with Life, ISE= Index of Self Esteem, LS\_F= Loneliness scale (frequency), LS\_I= Loneliness scale (Intensity).

**DISCUSSION OF RESULTS**

Of the 122 SPs, 59 respondents constituting the majority (48.36%), scored between 0 – 30 on the IAT; suggesting a normal internet usage as presented in table 2. A major finding in the current study is that none of our Study Participants (SPs) is severely addicted to Internet use, since no one scored within (80 – 100) range on the IAT. This is in line with research findings from Malaysia<sup>44</sup> who did not find any of their participants severely addicted to internet use. However, this is in sharp contrast to research findings of IA rates of 47.7% males and 44.5% female students in Bangladeshi undergraduates<sup>45</sup> and in 12% male and 5% female students in China from a systematic review of over 100 studies on IA by<sup>46</sup>. It is also in contrast with 0.5% in Italian students<sup>47</sup>, 8.2% in American and European cultures<sup>48</sup> between 17% and 26.8% in adolescents in Hong Kong<sup>49</sup> and a global prevalence of 1% to 25%<sup>50</sup> as well as 9.8% found in 835 Nigerian

<sup>44</sup> Haque et al., “Internet Use and Addiction among Medical Students of Universiti Sultan Zainal Abidin; Chamika and Dias, “Relationship of Internet Addiction with Depression, Loneliness”  
<sup>45</sup> Uddin et al., “Internet Addiction Disorder a Depression  
<sup>46</sup> Wallace, “Internet Addiction Disorder and Youth”.  
<sup>47</sup> Rocco Servidio, “Assessing the Psychometric Properties of the Internet Addiction Test: A Study on a Sample of Italian University Students.” *Computers in Human Behavior* 68 (2017): 17–29. <https://doi.org/10.1016/j.chb.2016.11.019>.  
<sup>48</sup> C.Gregory, INSERT TITLE OF THE ARTICLE “<https://www.Psycom.Net/Iadcriteria>.”INSERT DATE ACCESSED.  
<sup>49</sup> Daniel T.L. Shek and Lu Yu. “Adolescent Internet Addiction in Hong Kong: Prevalence, Change, and Correlates.” *Journal of Pediatric and Adolescent Gynaecology* 29, no. 1 (2016): S22–30. <https://doi.org/10.1016/j.jpjag.2015.10.005>.  
<sup>50</sup> R..Perrella, & Caviglia, “Internet Addiction. Adolescent and Adults.”; Treglia and Tomassoni, “Technological Use Behaviors, Internet Addiction and Personality among Italian University Students.”



undergraduates by.<sup>51</sup>

Two factors, namely; majority female participation and the course of study of our participants may have accounted for finding of no respondent scoring within internet addiction range (80 – 100). Firstly, since more males are vulnerable to IA than females globally, as male subjects seem to be more involved in computer-generated activities such as gaming, gambling and cybernetic sex etc.<sup>52</sup> It is not surprising that no respondent was found to be severely addicted to internet in this study with more female voluntary participants of 72, representing 59.02% than their male compatriots, with a participation of 48 representing 39.34% of the SPs. Had more males voluntarily participated, perhaps some could have scored in addiction ranges.

The second factor may have been the course of study of the participants. The general attitude towards medical education in Ghana is that, it is academically demanding in line with research evidence that suggests that health professional trainees have reported higher perceived stress than general population and students in other academic fields<sup>53</sup>. It is therefore possible that students in Allied health and medicine will be more resistant to the problematic use of the internet than their counterparts pursuing other university programs. This may be supported by the fact that the two recent researches by Chamika and Dias<sup>54</sup> that used 175 and 149 health trainees (Allied health and Medical) respectively, did not find any of their SPs scoring within severe IA range.<sup>54</sup>

Another 51 respondents constituting (41.80%) of our SPs who scored in the mild IA range spend a little more time on the internet than desired, even though they maintained a bit more control over their online activities with a score range of (scores 31 - 49). This finding is just slightly lower than 49% found by Haque et al, in Malaysian medical students and 57.5% in Italian subjects.<sup>55</sup> In contrast, it is higher than 27.4%, mildly found by Nduanya et al<sup>56</sup> in Nigerian undergraduates. Also, the finding of 12 respondents (9.84%) scoring within moderate IA (scores 50 – 79) is lower than 12.0% moderate addiction found by Chamika and Dias<sup>57</sup> in Sri Lankan students. It is also lower than 21.9% and 32% of the study participants who scored within moderate who had occasional or frequent difficulties due to Internet usage found by Servidio<sup>58</sup> and Haque et al<sup>59</sup> respectively. It is also lower than 12.9% found by Nduanya<sup>60</sup> in Nigeria. As per the discussion above, it is this 9.83% of our study participants that stand the risk of IA if they are not counselled to control their internet use with free internet connectivity recently made available in this university. Internet availability and differences in number of study participants may be major factors influencing the current results under discussion. This may be explained by the fact that internet speed and availability may be much better in most of these countries whose researchers have been reviewed in this study, compared to Ghana. Nigeria for example, has been estimated to have 61.4% internet penetration compared to 39.0% in Ghana according to 2019 figures by Miniwatt Marketing Group.<sup>61</sup> (Thus, it is not surprising that the current study found no addiction and relatively higher SPs scoring within normal and moderate IA ranges. Also, whereas internet availability in Asian and developed countries are obviously comparatively higher and faster, the same cannot be said about middle income country such as Ghana. Moreover, numerous institutions of higher education and colleges the world over, have long been offering high speed unrestricted internet connectivity to their students<sup>62</sup> which has recently been introduced in KNUST. Since addictive behaviors develop over time, it is not surprising the current finding revealed only 9.3% moderate internet users. Having said that, it is possible per the findings that some tertiary students in Ghana may develop IA, if the current internet availability continues for years to come as has happened in neighboring Nigeria and other developed countries.

Another factor worth mentioning in discussing the IA picture in relation with most of the reviewed IA researches, is the number of participants.<sup>63</sup> Thus, most of these researches whose participants scored within Internet Addiction

<sup>51</sup> Nduanya et al., “A Cross Sectional Study on Internet Addiction.”

<sup>52</sup> Morahan-Martin, and Schumacher, “Incidence and Correlates of Pathological Internet Use among College Students.”; Suet al “Computers in Human Behavior Are Males More Likely to Be Addicted to the Internet than Females?; Treglia and Tomassoni, “Technological Use Behaviors”.

<sup>53</sup> Ines Heinen, Monika Bullinger, and Růya-daniela Kocalevent “Perceived Stress in First Year Medical Students - Associations with Personal Resources and Emotional Distress. *BMC Medical Education*, 2017, 1–14. <https://doi.org/10.1186/s12909-016-0841-8>.

<sup>54</sup> Chamika and Dias, “Relationship of Internet Addiction with Depression”.

<sup>55</sup> Servidio, “Assessing the Psychometric Properties of the Internet Addiction Test.”

<sup>56</sup> Nduanya et al., “A Cross Sectional Study on Internet Addiction.”

<sup>57</sup> Chamika and Dias, “Relationship of Internet Addiction with Depression.”

<sup>58</sup> Servidio, “Assessing the Psychometric Properties of the Internet Addiction Test.”

<sup>59</sup> Haque et al., “Internet Use and Addiction among Medical Students of Universiti Sultan Zainal Abidin”

<sup>60</sup> Nduanya et al., “A Cross Sectional Study on Internet Addiction.”

<sup>61</sup> Miniwatts Marketing Group, “Internet World Stats – Usage and Population Statistics.”

<sup>62</sup> Masud et al., “Measuring Psychological Effects and Internet Addiction”; Nduanya et al., “A Cross Sectional Study on Internet Addiction.”

<sup>63</sup> Uddin et al., “Internet Addiction Disorder and Its Pathogenicity to Psychological Distress”; Bahrainian et al., “Relationship of Internet Addiction with Self-Esteem and Depression in University Students”; Lachmann et al., “The Role of Empathy and Life Satisfaction in Internet and Smartphone Use Disorder”; Masud et al., “Measuring Psychological Effects and Internet Addiction towards Academic Performance of Tertiary Students in Malaysia”; Salarvand et al., “Corrigendum to: The Prevalence of Internet Addiction”.



ranges (i.e. Between 80 – 100, on the IAT), had participants in excess of 159; in fact, 475, 408, 916, 220, 835 and 160 respectively which were all far greater than 122 SPs used in this study.

## **RELATIONSHIP OF IA WITH PSYCHOLOGICAL VARIABLES OF INTEREST IA AND SATISFACTION WITH LIFE (SWL).**

The findings revealed that Internet Addiction Test (IAT) had a weak highly significant negative correlation with Satisfaction with Life ( $r = -0.237$ ;  $p = 0.009$ ). This is suggestive of the fact that as individual's internet use increases, his/ her subjective cognitive assessment of general life satisfaction or quality of life decreases and vice versa. This study replicates findings by Lachmann et al<sup>64</sup>, who found that Internet Use Disorder (IUD) was negatively associated with life satisfaction in a dual cultural (Chinese and German) samples, except that the correlation in this study was weaker than they reported. Interestingly, Lachmann<sup>65</sup> also found a negative association between Smart gadgets Use Disorder (SUD) and life satisfaction in their Chinese samples. This current finding on the other hand is in sharp contrast with findings by Erdogan & Yildirim,<sup>66</sup> who found a weak but significant positive relationship between internet addiction and life satisfaction in Turkish vocational students.

## **IA AND INDEX OF SELF ESTEEM (ISE)**

In the literature, low self-esteem seems to be one of the most powerful risk factors for internet addiction<sup>67</sup>. The findings however revealed an insignificant weak positive correlation between IAT and Index of Self Esteem ( $r = 0.173$ ;  $p = 0.056$ ). This replicates findings by Bahrainian et al., (2014)<sup>68</sup> who found a significant positive correlation between self-esteem and internet addiction in their participants. It must be added however, that the correlation was a weak one in the present SP. Thus, as the individual's score on the ISE increases (indicating lower self-esteem), internet use and possible addiction goes up at a relatively slower pace. This finding is however, in contrast to those of Seabra et al<sup>69</sup> and Salarvand et al<sup>70</sup> who found a significant but inverse relation between IA and self-esteem scores. Thus, as the individual's score on the self-esteem increases (indicating lower self – esteem), internet use and possible addiction increases. In fact, the possible explanation for the contrast might be their usage of different self-esteem scales (Rosenberg's Self-esteem Scale) whose scoring (described on page 393 of<sup>71</sup>), is direct opposite of the scoring ISE used in this current study.

## **IA AND LONELINESS**

Loneliness was assessed in two ways namely; its frequency and intensity in this study. It was established that both the frequency and intensity had a weak positive non-significant relationship with IA (frequency;  $r = 0.051$ ;  $p = 0.581$ ; intensity;  $r = 0.087$ ;  $p = 0.341$ ). This is in agreement with research evidence from Ezoe et al<sup>72</sup> who found a positive relationship between internet addiction and loneliness. Therefore, internet use leads to loneliness which separates internet addicts from real life social interactions. The observed weaker correlation may be as a result of females being the majority participants in current study. There is a possibility of gender differences in possible actions where females will engage in (e.g. seek social contact and/ or intimacy), when lonely, than what males may likely do (e.g. go online for games, cybernetic sex, operate gadgets etc.).

## **LIMITATION OF THIS STUDY**

The findings from this current study ought to be interpreted cautiously because of a number of limitations. Firstly, the findings of this research were based on only 122 female-dominated voluntary participants. The researchers are of the opinion that this low voluntary participation by the students limited the statistical power and that it is possible that

<sup>64</sup> Lachmann et al., "The Role of Empathy and Life Satisfaction in Internet and Smartphone Use Disorder."

<sup>65</sup> Ibid.

<sup>66</sup> T. Erdogan., O.G. Yildirim, H.C. Cigdem, H. C. "A Descriptive Study on Vocational College Students' Internet Addiction and Meslek Y ksekokulu ğrencilerinin İnternet Bağımlılıkları İle Çeşitli Introduction In the Last Decade, the Internet Has Facilitated Our Lives by Making Information', pp." 5, no. 2 (n.d.): 46–59. (please check)

<sup>67</sup> C. H. Ko, , J. Y Yen,, C. C., Chen, S. H., Chen, & Yen, "Factors Predictive for Incidence"; Treglia and Tomassoni, "Technological Use Behaviors."

<sup>68</sup> Bahrainian et al., (2014)

<sup>69</sup> Seabra et al., (2017)

<sup>70</sup> Salarvand et al., "Corrigendum to: The Prevalence of Internet Addiction".

<sup>71</sup> Ibid.

<sup>72</sup> C Ezoe, Satoko, Tadayuki Iida, Ken Inoue, and Masahiro Toda. "Development of Japanese Version of Smartphone Dependence Scale." *Open Journal of Preventive Medicine* 06, no. 07 (2016): 179–85. <https://doi.org/10.4236/ojpm.2016.67017>; Chamika and Dias, "Relationship of Internet Addiction with Depression, Loneliness and Health Related Lifestyle among University Students"; Patterson et al, "Internet Paradox"; J.Panicker, and R. Sachdev, "Relations among Loneliness, Depression, Anxiety, Stress and Problematic Internet Use." *International Journal of Research in Applied, Natural and Social Sciences* 2, no. 9 (2014):1-10.

there may be students who are already addicted but failed to participate. Widening the scope to cover the whole student population of the university and possibly a few other Universities in the Kumasi metropolis, may help obtain a much better picture of use of internet and its addiction in Ghana.

Secondly, this study used cross-sectional methodology which cannot establish a causal relationship between IA and the psychological variables studied. Thirdly, this research was limited to KSMD students, thus making it very difficult to even generalize its conclusions to KNUST students, and much less to all tertiary students in Ghana.

A comparative research with a bigger representative sample from different colleges and universities in Ghana is very much recommended to obtain a much better picture of internet addiction among the youth of Ghana

## CONCLUSION AND RECOMMENDATION

This preliminary research revealed that while severe IA is not yet a serious problem, 9.83% and 41.3% of the study population suffer from moderate and mild IA respectively and, stand the risk of progressing to the severe end of the IA continuum, if not counselled to master control over their internet use. This study also revealed that participants who are excessive internet users are prone to be unsatisfied with life, lonely, have low esteem, and probably tend to derive solace in the use of the internet. However, there was no correlation between IA and common belief among this study's SPs. Findings from this research will add to the extant research evidence on internet use and Addiction in the youth in Ghana and Sub Saharan Africa as a whole.

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