

Internet Addiction in Africa: A Study of Namibian and Ugandan College Students

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ABSTRACT

Digital devices (mobile phones, computers, tablets, etc.), the Internet, easy access to online information, and social networking sites have led to the charge in promoting the phenomenon of Internet addiction (IA). This research examines the suitability and validity of a well-established instrument for measuring IA among college students in Africa. Data collected from 311 university students in Namibia and 150 university students in Uganda is used to validate the instrument and also to measure the levels of Internet addiction among students. The analysis shows that a sizable majority of the students in both countries suffer frequent addiction problems due to the Internet use. Also, the results indicate that the underlying Internet addiction psychometric constructs are different in the African context than those in the western world.

Keywords: Internet Addiction, Psychometric constructs, Uganda, Namibia, Factor analysis

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1.0 INTRODUCTION

While easy access to reliable information technologies has enhanced personal and organizational performance globally, compulsive and excessive technology use is also on the rise due to our increasing dependence on information technologies. Prior studies have suggested that technology addiction, which is defined as “an obsessive pattern of IT-seeking and IT-use behaviors that takes place at the expense of other important activities,” leads to negative psychological, behavioral and cognitive consequences (Turel et al., 2011, p. 1044). One prominent type of technology addiction, Internet addiction, which refers to an excessive and uncontrolled need to use the Internet, is found to be prevalent among young people globally. It is found to have the potential to negatively affect one’s effectiveness, health, happiness, and relationships. Literature shows that excessive and problematic use of the Internet can lead to social isolation, neglect of school and household responsibilities, relationship problems, and overwhelming pre-occupation with the Internet (Griffiths, 2000; Morahan-Martin, 2008; Widyanto & McMurran, 2004; Young, 1996). Further, Davis et al. (2002) found that problematic Internet use went beyond merely spending too much time on the Web and that it led to diminished impulse control, loneliness, depression, distraction, and using the Internet as a tool for social comfort. This is further confirmed by the study of Razieh et al. (2012) which found that preexisting mental conditions such as anxiety is a significant predictor of Internet addiction among university students. As a social comfort tool, the Internet tends to provide distraction that allows addicts to procrastinate or avoid stressful events, tasks, or thoughts.

However, Internet addiction often goes undiagnosed clinically, is difficult to diagnose, and is frequently denied by addicts due to the fact that utilization of the Internet is often encouraged at work and school (Young, 1999). While time spent online has been found to have a strong, positive correlation with Internet addiction, it should not be the only indicator of problematic use of the Internet. Based on the Internet Addiction Test (IAT) developed by Young (1998), Widyanto et al. (2011) identified three underlying factors that collectively define Internet addiction, psychological/emotional conflict, time management, and mood modification. Psychological/emotional conflict factor refers to one’s preference to being online over other social activities such as spending time with friends and family. This is consistent with the findings of the study of 371 British students by Niemi et al. (2005), which found that Internet addiction was linked to low self-esteem and a lack of social inhibition. Time management factor shows that individuals with Internet addiction choose to spend time online at the cost of neglecting other responsibilities and decreased productivity. The third factor, mood modification, is especially troubling as it suggests that individuals with Internet addiction tend to develop other emotional problems such as depression, moodiness, and anxiety in the absence of the Internet. Yet another study that examines the psychological profiles of Internet addicts confirms this finding and suggests that Internet addicts are more likely to try to escape from the reality than non-addicts do and turn to the Internet when they are stressed or depressed (Whang et al., 2003). This evidence confirms that the impact of Internet addiction goes beyond reduced productivity and has profound implications to the psychological well-being of individuals and stability of social units.

The medical community has offered neurobehavioral support for the similarities between Internet addiction and substance addictions. It argues that both addictions result from mental conditions such as diminished impulse control, which, in the case of Internet addiction, is manifested by obsessive cognitions about the Internet and inability to reduce Internet use (Yellowlees and Marks, 2007). Internet addicts have been consistently found to be more impulsive than non-addicts (Saville et al., 2010). In one study, subjects suffering from Internet addiction showed levels of trait impulsivity as high as those exhibited by pathological gamblers suggesting that Internet addiction should be conceptualized as an impulse control disorder (Lee, et al., 2012). Furthermore, addiction to the Internet as a medium has been found to lead to compulsive gambling and consumption on the Internet (Turel et al., 2011; Widyanto, et al., 2011). Prior studies have also found that Internet addiction is a global phenomenon,

especially among university students (Frangos et al., 2010; Huang, et al., 2007; Lin, et al., 2011). Technology acceptance and user research assert that Internet addiction leads to inflated perception of the online system and biased reasoning justifying the individual's overuse of the Internet; therefore, researchers recommend that Internet addiction should be incorporated in Internet use studies (Thomas, 2011; Turel, et al., 2011). This rationale leads us to believe that Internet addiction potentially leads to and/or exacerbates a wide range of dysfunctional, uncontrollable impulsive behaviors related to technology use exhibited by young people today.

The Internet use among young people is considerably higher than other age groups. Among college students, Internet addiction is shown to be positively associated with their propensity to engage in in-class digital distraction, i.e., use digital devices in class to perform activities that are unrelated to the class or the course (Fried, 2008; Martin, 2011; Muyingi et al., 2012; Wood et al., 2012). Several studies have shown that the use of digital technologies (e.g., computers, mobile phones, Internet) in the classroom has a negative association with course performance (Fried, 2008; Junco & Cotton, 2011; Kraushaar & Novak, 2010; Martin, 2011; Wurst et al., 2008). Martin (2011) reports that holding business statistics classes in a computer equipped classroom had a detrimental effect on student performance. In fact, Wood et al. (2012) found that students not using any digital technologies in the classroom outperformed students with technology use. These findings are supported by and can be partially explained by studies that focus on the effect of multitasking. While multitasking has become a necessary skill in today's digital society, prior studies have consistently found that people who multitask perform at a lower level compared to counterparts who perform tasks sequentially (Ophir et al., 2009). Studies have pointed out that multitasking tends to result in the acquisition and recall of less information while learning (Foerde et al., 2006). This is not surprising because Kraushaar and Novak's (2010) found that students tend to engage in distractive multitasking in class about half of the time. Furthermore, habitual multitasking may condition the learner's brain to an overexcited state making it difficult for the learner to focus (Wallis, 2006). These evidences all point to the conclusion that Internet addiction can be detrimental to the individual's learning efforts.

Internet addiction is a global phenomenon as the relevant technologies are becoming widely available and accessible globally; therefore, studying Internet addiction in an international context is important. While most existing literature on Internet addiction is US-centric, this study focuses on Internet addiction among university students in Namibia and Uganda. Although the overall level of ICT readiness and use in sub-Saharan Africa is still very low, Internet and mobile phone usage in the region has increased substantially over the past years. For example, at the end of 2011, the subscription rate for mobile phones was 53.1% up from 12.4% in 2005 (ITU, 2012). In addition, Africa has become the second largest mobile market in the world in terms of the number of subscribers. Figures for the Internet also show a similar trend: 12.4% in 2011 versus 2.4% in 2005. Increased adoption rates and the proliferation of online content and social networks bring with them the capability of anytime-anywhere connectivity. Clearly, the benefits of this digital connectedness are undeniably numerous and advantageous in ways not possible before. According to the World Economic Forum's 2012 Global Information Technology Report (2012), which measures the extent to which information and communications technology (ICT) is used in 142 countries to enhance their economy and competitiveness, most African nations still experience low connectivity due to an insufficient development of ICT infrastructure and low levels of skills that prevent available technology infrastructure being utilized efficiently.

The two countries included in this study, Namibia and Uganda, ranked 105th and 110th, respectively, among the 142 countries in terms of network readiness index, which measures the degree to which countries leverage ICT to enhance their economies. The individual usage index, which measures ICT penetration and diffusion at the individual level, showed similarly low rankings for the two countries (Namibia: 106th; Uganda: 117th). The impact index demonstrated that information technology has relatively low impact on the economy and society in Namibia (ranked 119th) and Uganda (ranked 115th). Nevertheless, both Namibia (ranked 44th) and Uganda (ranked 91st) showed a relatively friendly market and regulatory framework in supporting ICT uptake, entrepreneurship and innovation suggesting improved ICT conditions in the near future, especially with regard to mobile technologies. There is clearly a need to increase the diffusion of ICT and improve ICT infrastructure in this region to support the much-needed economic development and transformation from a resource-extraction-based economy to production- and service-based economy. However, at the same time, it is also critical to be vigilant about the negative consequences (e.g. Internet addiction) that ICT brings that may threaten the well-being of the people and societies of this region.

The primary objective of this study is to cross-validate the Internet Addiction Test and examine the psychometric properties of the test in the context of African university students. While the IAT has been widely adopted to evaluate the level of Internet addiction among students globally, the underlying psychometric factors may differ across cultures. This study will examine whether the same underlying factors of IAT identified by Widyanto et al. (2011) can be found among African students. The second objective of this study is to evaluate the level of Internet addiction among African students and examine the impact of student demographics on Internet addiction.

2.0 RESEARCH METHODOLOGY

2.1 Questionnaire

To measure addiction to the Internet, a 20-item Internet Addiction Test (IAT) developed by Young (1998) was used. Each of the 20 items is measured using a 5-point Likert scale (1 = Never; 5 = Very Frequently). This instrument has been used in many studies and validated in various settings (Davis, Flett, and Besser, 2002; Widyanto and McMurrin, 2004; Widyanto et al., 2011). Further, it has been shown that there are three underlying psychometric constructs of the IAT: emotional/psychological conflict; time management issues; and mood modification. Table 1 lists the twenty (20) items comprising the IA instrument. The table also shows the composition of the three underlying psychometric constructs. In addition to these twenty items, the questionnaire also asked respondents to provide information about their gender, age, year in school, daily time spent online, and multitasking ability.

Table 1. Internet Addiction Test (IAT) Items (Widyanto, Griffiths and Brunnsden, 2011)

Please circle the number that most closely reflects your reaction to the following statements using the following scale:

1 = Never; 2 = Rarely; 3 = Sometime; 4 = Frequently; 5 = Very Frequently

How often...

1. Do you prefer the excitement of the Internet to intimacy with your friends or family?
2. Do others in your life complain to you about the amount of time you spend online?
3. Does your job/school performance or productivity suffer because of the Internet?
4. Do you become defensive or secretive when anyone asks you what you do online?
5. Do you block disturbing thoughts about your life with soothing thoughts of the Internet?
6. Do you find yourself anticipating when you will go online again?
7. Do you try to cut down the amount of time you spend online and fail?
8. Do you try to hide how long you've been online?
9. Do you choose to spend more time online over going out with others?
10. Do you find that you stay online longer than you intended?
11. Do you neglect household chores to spend more time online?
12. Does your work suffer (e.g. postponing things, not meeting deadlines, etc.) because of the amount of time you spend online?
13. Do you check your e-mail before something else that you need to do?
14. Do you find yourself saying "Just a few more minutes" when online?
15. Do you form new relationships with fellow online users?
16. Do you fear that life without the Internet would be boring, empty, and joyless?
17. Do you snap, yell, or act annoyed if someone bothers you while you are online?
18. Do you lose sleep due to late-night log-ins?
19. Do you feel preoccupied with the Internet when off-line, or fantasize about being online?
20. Do you feel depressed, moody, or nervous when you are off-line, which goes away once you are back online?

Factor

Emotional/Psychological conflict – 1 – 9

Time Management issues – 10 – 14

Mood Modification – 15 – 20

2.2 Data Collection

Data for this study was collected during the Fall semester of 2012. In Namibia, data were gathered from students at the Polytechnic of Namibia and the University of Namibia. In Uganda, the participants were students at Makerere University. There were a total of 311 complete and usable responses from Namibia (210 at the Polytechnic of Namibia and 103 from the University of Namibia) and 150 from Uganda. This provided us usable data from a total of 461 university students in both Namibia and Uganda.

3.0 RESULTS

3.1 Student Profile

Table 2 shows the profiles of responding students. The male/female breakdown in the sample was: Namibia: 54% males and 46% females; Uganda: 58% males and 42% females. In the Namibia sample, nearly twenty-eight (28%) percent of the students are under the age of twenty while for Uganda, this percent is only 8%. In both samples, the overwhelming percent of the respondents were undergraduate students (98% in Namibia and 99% in Uganda). With respect to daily time spent online, the two groups of students appear to be substantially different. In Namibia, 65.3% of the students report spending, on average, less than an hour online per day. However, this percentage is only 41.4% for Uganda students. The percentages of students who spend more than two hours online per day are 17.9% and 23.4% for Namibia and Uganda, respectively. Thus, students in Uganda spend considerably more time online than their counterparts in Namibia. Further, in both groups, nearly 90% of the students report being “effective” to “extremely effective” in multitasking (being able to perform multiple tasks simultaneously).

Table 2. Profile of Students by Country

	<u>Namibia (n = 311)</u>			<u>Uganda (n = 150)</u>			
	<u>n</u>	<u>%</u>	<u>Mean IAn</u>	<u>%</u>	<u>Mean IA</u>		
Gender							
	Male	155	54%	2.42	87	58%	2.53
	Female	148	46	2.30	63	42	2.39
Age							
	Under 20	83	27.9%	2.39	12	8.0%	2.78
	20 and under 22	115	38.7	2.39	94	62.7	2.48
	22 and under 25	44	14.8	2.42	32	21.3	2.29
	25 and under 30	28	9.4	2.06	8	5.3	2.46
	Over 30	27	9.1	2.31	3	2.0	2.76
School Year							
	First Year	95	32.1%	2.29	56	37.6%	2.58
	Second Year	111	37.5	2.36	49	32.9	2.56
	Third Year	46	15.5	2.49	42	28.2	2.23
	Fourth Year	38	12.8	2.21	1	0.7	2.88
	Masters	6	2.0	2.92	1	0.7	1.84

Average Daily Time Spent online

Less than 15 minutes	63	20.9%	2.08	12	8.0%	2.46
15 and under 30 minutes	63	20.9	2.13	13	8.7	2.20
30 and under 60 minutes	71	23.5	2.47	37	24.7	2.50
1 hour and under 2 hours	50	16.6	2.43	51	34.0	2.37
2 hours and under 4 hours	30	9.6	2.62	19	12.7	2.72
Over 4 hours	25	8.3	2.89	16	10.7	2.71

Multi-Tasking Effectiveness

Not effective at all	11	3.7%	2.54	4	2.7%	2.11
Somewhat Effective	16	5.4	2.50	11	7.4	2.68
Effective	103	34.4	2.34	36	24.3	2.55
Very Effective	127	42.5	2.34	71	48.0	2.48
Extremely Effective	42	14.0	2.30	26	17.6	2.30

3.2 Validation of the Internet Addiction Test

In order to confirm the applicability of the underlying psychometric constructs of the IAT for Africa, a factor analysis was performed on the twenty items comprising the test as shown in Table 1. If the psychometric constructs are the same, then it is expected that the factor analysis of the items will yield the same underlying structure as previously suggested. Factor analysis is a statistical technique used to identify underlying factors from a large number of interrelated variables (Norusis, 1990). Principal components analysis was used for factor extraction to obtain estimates of the initial factors that account for the largest variance in the sample. The rule used to finally determine the number of factors to include was the “eigenvalue greater than one” criterion (Kaiser, 1974). This criterion resulted in a three-factor solution which explains 44.59 percent of the variation. Subsequently, Varimax rotation was chosen as the method of transforming the initial factors into a more meaningful configuration.

In this factor analysis, a total of 20 items were subjected to confirmatory factor analysis. Stevens (1986) recommended a cases-to-variables ratio of 5:1 to guarantee a reliable factor analysis procedure; however, some researchers such as Fuller and Swanson (1992) have worked with ratios as low as 2:1. There were a total of 461 cases for the 20 items, resulting in a cases-to-variables ratio of nearly 23:1, which far exceeds the suggested ratio limits.

Table 3 shows the factor loadings of the items for the three underlying factors. Factor loadings resulting from the Varimax rotation were evaluated using the threshold of 0.40 which is higher than the recommended level of 0.35 by Churchill (1979). Item 13 (Do you check your e-mail before something else that you need to do?) did not load on any of the three factors and thus is excluded from further consideration. One possible explanation for this could be that many college students are using social networking sites to communicate as opposed to the e-mail. This fact alone calls for updating the Internet addiction test items. Using the lower bound of 0.40, all remaining nineteen items loaded on only one factor with the exception of item 14 (Do you find yourself saying “Just a few more minutes” when online?) which loaded on two factors with loading values of 0.433 and 0.459, respectively. It was decided to bond item 14 with the factor with the higher loading (factor 2).

Table 3. Factor Loadings of the Internet Addiction Items

Item	F1	F2	F3
I17	.736	.096	.206
I16	.721	.142	-.122
I20	.690	.164	.270
I15	.664	.186	-.001
I19	.577	.392	.201
I18	.516	.180	.351
I9	.504	.140	.259
I5	.107	.725	.020
I6	.265	.601	.147
I7	.046	.535	.329
I10	.315	.496	.235
I1	.330	.490	-.066
I14	.433	.459	.241
I12	.289	.136	.646
I11	.330	.108	.585
I8	.102	.354	.513
I2	.101	.362	.507
I3	-.036	-.172	.507
I4	.070	.277	.487
I13	.149	.021	.298
Eigenvalues	5.87	1.47	1.14
% of variance explained	30.87	7.72	6.00

F1 - Mood Modification

F2 – Pleasure and Time Management Issues

F3 – Social and Work Dysfunction

An examination of the factor loading and associated items in Table 3 leads us to describe the underlying factors. Factor 1 includes seven items (items 9, 15, 16, 17, 18, 19 and 20) that evaluate the respondent’s emotional dependence on the Internet. For example, one question asks the Internet user whether he or she fears the life without the Internet to be boring, empty, and joyless. These seven items include all the six items that comprise the “mood modification” factor as proposed by Widyanto et al. (2011) plus item 9 (Do you choose to spend more time online over going out with others?). Choosing to be online over going out can be considered an indication of mood modification through online activities. Thus, this factor is nearly the same as previously proposed by Widyanto et al. (2011). This suggests that mood modification construct exists in both US and African contexts. However, the percent of variation explained by this factor is significantly higher for African students than reported in Windyanto et al. for non-African participants: 30.87% versus 5.61%. This suggests that Internet addiction of African university students is best characterized by their strong emotional dependence on the Internet.

Factor 2 contains six items (Items 1, 5, 6, 7, 10 and 14). These items relate to the affective reaction of the individual to the Internet, the inability to control the time spent online, and foregoing intimacy with family and friends to be online. Therefore, this factor is named “Pleasure and Time-management.” This factor mixes items from “Time Management Issues” and “Emotional/Psychological Conflict” factors proposed by Widyanto et al. (2011). This factor accounts for 7.72% of the variance.

Factor 3 consists of six items (Items 2, 3, 4, 8, 11, and 12). These items tap into the social and work dysfunctions caused by excessive use of the Internet. The social dysfunctions are manifested through defensiveness and/or secretiveness to other’s inquiry about one’s Internet use, and work dysfunctions are reflected by neglecting one’s responsibilities and declined performance at school or work. This factor measures how excessive Internet use has

negatively affected other aspects of the Internet user’s life. This factor is named “Social and work Dysfunction” and explains 6.00% of the variance.

Based on factor analysis, the overall factor structure of Internet addiction among African students is found to be different from the factor structure developed by Widyanto et al. (2011). One structure of one factor (mood modification) dealing with the dependency on the Internet for comfort and mood enhancement is nearly identical for African and western students. The other two factors are composed of different underlying traits than the factors present for western students. Also, it is worth emphasizing that the most dominant factors (as indicated by the percent of variance explained) are different in the two settings. Table 4 summarizes the previously identified factors along with the ones identified in this study. Clearly, “mood modification” is the most prominent aspect of IA for African university students as it explains nearly 31% of the variance. This factor only explained 6.61% of the variation for studies conducted in the western world. Windyanto et al. (2011) study had identified “emotional/psychological conflict” as the most dominant factor explaining 42.67% of the variance. This clearly shows that among African students, emotional dependence on the Internet is more common compared to western students.

Table 4. Comparison of Factor Structures

Widyanto et al. (2011) Study			
	<u># Items</u>	<u>Items</u>	<u>% variation explained</u>
Emotional/Psychological conflict	9	1 – 9	42.67
Time Management issues	5	10 – 14	7.97
Mood Modification	6	15 – 20	5.61
This Study*			
Mood Modification	7	9, 15 - 20	30.87
Pleasure & Time Management	6	1, 5 – 7,10, 14	7.72
Social and Work Dysfunction	6	2 – 4, 8, 11 – 12	6.00

*Item # 13 is not included in this study as it did not load on any of the three factors

3.1 Internet Addiction

To measure the level of Internet addiction among students, the mean and standard deviation (SD) of each of the 19 items were calculated. Also calculated were the mean and SD of the three newly identified underlying factors of IA and are shown in Table 5. The score for a factor is simply the averages of the items that comprise the factor. To see if the mean IA scores are statistically significantly different for the students in the two countries, t-tests were conducted. Items with statistically significant different means are marked with an asterisk. Note that the mean score for “mood modification” is significantly higher for Ugandan students than that for Namibian students at the .01 level of significance ($t = -2.75$; $p = 0.006$). This shows that Ugandan students are more prone to spending time online than going out, forming online relationships, believing life will be boring without the Internet, getting annoyed if disturbed while online, and feeling moody and depressed when offline. For the other two factors, “pleasure and time-management issues” and “social and work dysfunction” t-tests show no differences between the two countries. In fact, out of the nineteen items, there is only item where the mean for Namibian students in significantly higher than that of the Ugandan students and this item is I3: Does your job/school performance or productivity suffer because of the Internet? This shows that Namibian students are more likely to let their school/job performance slip as a result of being online.

Table 5. Mean and Standard Deviation (SD) of Internet Addiction Items for Namibia and Uganda

	<u>Namibia (n= 311)</u>		<u>Uganda (n = 146)</u>		<u>Sig of mean Diff</u>
	<u>Mean</u>	<u>SD</u>	<u>Mean</u>	<u>SD</u>	
<u>Mood Modification</u>	2.34	0.93	2.65	0.91	*
9. Do you choose to spend more time online over going out with others?	2.22	1.32	2.63	1.43	*
15. Do you form new relationships with fellow online users?	2.70	1.37	3.20	1.37	*
16. Do you fear that life without the Internet would be boring, empty, and joyless?	2.96	1.50	3.46	1.44	*
17. Do you snap, yell, or act annoyed if someone bothers you while you are online?	2.03	1.27	2.36	1.29	*
18. Do you lose sleep due to late-night log-ins?	2.35	1.40	2.17	1.38	
19. Do you feel preoccupied with the Internet when off-line, or fantasize about being online?	2.13	1.26	2.33	1.33	
20. Do you feel depressed, moody, or nervous when you are off-line, which goes away once you are back online?	1.99	1.30	2.37	1.41	*
<u>Time Management Issues</u>	2.71	0.88	2.73	0.85	
1. Do you prefer the excitement of the Internet to intimacy with your friends or family?	2.87	1.33	2.62	1.36	
5. Do you block disturbing thoughts about your life with soothing thoughts of the Internet?	2.37	1.35	2.53	1.34	
6. Do you find yourself anticipating when you will go online again?	2.49	1.25	2.67	1.37	
7. Do you try to cut down the amount of time you spend online and fail?	2.47	1.36	2.32	1.28	
10. Do you find that you stay online longer than you intended?	3.11	1.39	3.15	1.49	
14. Do you find yourself saying “Just a few more minutes” when online?	2.95	1.35	3.04	1.43	

<u>Social and Work Dysfunction</u>	2.02	0.84	2.00	0.74	
2. Do others in your life complain to you about the amount of time you spend online?	1.95	1.21	1.85	1.11	
3. Does your job/school performance or productivity suffer because of the Internet?	2.25	2.17	1.84	1.23	**
4. Do you become defensive or secretive when anyone asks you what you do online?	2.04	1.18	2.04	1.25	
8. Do you try to hide how long you've been online?	1.84	1.15	2.01	1.33	
11. Do you neglect household chores to spend more time online?	2.06	1.19	2.22	1.34	
12. Does your work suffer (e.g. postponing things, not meeting deadlines, etc.) because of the amount of time you spend online?	1.96	1.24	2.01	1.22	

*difference significant at the .01; **difference significant at the .05 level.					
Overall Addiction Score:	2.36	0.75	2.47	0.69	

Next, to compute an overall measure of Internet addiction for each student, the average of the nineteen (19) items was computed. The mean addiction scores averaged over all students for the two countries are shown at the bottom of Table 5. For Namibia, this number is 2.36 and for Uganda, it is 2.47 and these averages are not significantly different. This indicates that, overall, the two groups of students have essentially the same IA levels. However, the two groups differ substantially on the most important dimension of IA, namely “mood modification” as we discussed above.

Widyanto et al. (2011) have further suggested classifying individuals into groups according to the intensity of their addiction using the overall Internet addiction (IA) score. These groups are defined as follows:

<i>Average online user</i>	IA score between 1.00 and 1.95
<i>Frequent problems with Internet use</i>	IA score between 2.00 and 3.45
<i>Significant problems with Internet use</i>	IA score between 3.50 and 5.00

Table 6 shows the distribution of students in each of the three groups for the two countries. In Namibia 34.3% of the students are average online users as opposed to 25% in Uganda. A sizable majority of the students in both countries suffer significant Internet problems (Namibia: 59.2% and Uganda: 70.3%). In both countries, a small percent (about 5 - 6%) of the students have significant problems with the Internet use. To statistically test whether there is a significant association between the country and IA classification, a Chi-Square test for association was performed. It revealed statistical significance ($\chi^2 = 7.92$; $p = .019$) at the .05 level. This shows that Ugandan students have significantly more IA problems than Namibian students.

Table 6. Internet Addiction Classification of Students

Internet Addiction Classification	Namibia			Uganda		
	n	%	Mean IA	n	%	Mean IA
Average online user	106	34.3%	1.53	37	25.0%	1.58
Frequent problems due to Internet use	183	59.2	2.67	104	70.3	2.69
Significant problems due to Internet use	20	6.5	3.80	7	4.7	3.70

Next, to see if there were differences in IA according to student demographics, a series of Analysis of Variance (ANOVA) procedures were performed – one for each demographic variable. Table 2 shows the values of the IA for different demographic variables. In our analyses, no significant differences were found, indicating that IA is equally pervasive among male and female students; across different age and school year groups. Next, to see if there was an association between IA and time spent on line, Pearson’s correlation coefficients between the two variables were calculated for each country. For Namibia the correlation coefficient was +0.317 (p-value = .0000) which is statistically significant at the .01 level. For Uganda, the correlation coefficient was found not to be statistically significant (correlation = +0.137; p-value = .049) at the .01 level. This indicates that the IA levels of Ugandan students are not tied to the amount of time spent online. This could be due to the fact that a majority of them (57.4%) are already spending more than an hour per day online. On the other hand, only 24.5 % of their counterparts in Namibia do so. Thus, once a student reaches a certain threshold for online time, additional time spent online is inconsequential to how addicted the student is to the Internet.

4.0 SUMMARY AND DISCUSSION

One objective of the study is to examine whether the same psychometric factors of Internet addiction emerge among African students as previously proposed. The results suggest a different underlying factor structure for students in Africa. Three factors, “mood modification,” social and work dysfunction,” and “pleasure and time-management”, are identified and they collectively explain 42.9% of the variance. Dependence on the Internet for “mood modification” is found to explain the highest percentage of variance of Internet addiction among African students whereas psychological/emotional conflict explains the most variance in Internet addiction among western users. Interestingly, mood modification factor accounts for the least amount of variance (5.6%) in Internet addiction among western users. This suggests that clinical diagnosis of Internet addiction among African Internet users should not just focus on the obvious measures such as amount of time spent online and reduced performance caused by excessive Internet use but rather on the individual’s emotional dependence on the Internet for mood modification. This is especially important for regions where the Internet infrastructure is not as widely available and accessible as that in a developed country. For example, a study by Nath et al.’s (2013) reports that African university students spent substantially less time online on average compared to US students, but the level of Internet addiction and percentage of students with frequent and significant problems due to Internet use is comparable between the two groups. The lower absolute number of hours spent online exhibited among African students may be due to lack of access to the technology rather than low level of Internet addiction.

The factor analysis also suggests that some update to the Internet addiction test items is needed. Item 13, which asks the respondent the extent to which he or she checks email before performing other necessary tasks, did not load on any of the three factors. This may be due to the fact that email is no longer the predominant Internet application today. Other applications such as social network sites are taking over email as the most frequently used applications among youngsters. Therefore, the Internet addiction test items need to be updated to reflect the changes in technological and social environments.

The average Internet addiction scores of Namibian and Uganda university students were found to be in the moderate range suggesting frequent problems due to Internet use. While the overall Internet addiction levels are not significantly different between Namibian and Ugandan students, Ugandan students exhibit a significantly higher level of dependence on the Internet for mood modification than Namibian students. In the study of Nath et al. (2013), it was found that US university students have significantly lower mood modification score but significantly higher time-management problem score than Namibian students. These findings indicate that while the overall Internet addiction scores of different nations may be similar, the scores for underlying psychometric factors can be significantly different among nations. The difference may be attributed to the differences in national culture, economic condition, and information technology infrastructure. Many prior studies provide overwhelming support to the notion that cultural differences, differences in economic conditions, and technology infrastructure issues must be taken into account in studying technology use behaviors (Srite and Karahanna, 2006; Straub, et al., 1997). This finding suggests that in different cultures, intervention programs that aim to reduce Internet addiction may be designed to target different underlying psychometric underpinnings of IA. For example, to reduce Internet addiction in Uganda, one should focus on introducing healthy and constructive approaches for mood modification as a solution to reducing the individual’s dependence on the Internet.

5.0 LIMITATIONS AND FUTURE RESEARCH

There are two limitations to this study. First, the study employed questionnaire approach to collect data about Internet addiction – thus, self-reporting may have led to an underestimation of the true levels of addiction. Some subjects might choose to underreport their level of Internet use and dependence and overemphasize their work and school performance. While this limitation is inherent to the fact that IAT was designed as a self-assessment measure of Internet addiction, it is recommended that future research evaluate how well IAT measures Internet addiction by employing objective measures. Second, the samples of this study were university students between the ages of 20 and 30. A sample that is more diverse and covers a wide range of age may improve the generalizability of the findings as the Internet is a widely used technology among all age groups today.

Additional research directions stem from this study. First, there is a lack of empirical studies on the impacts of Internet addiction on student learning performance and interpersonal skill development; therefore, future studies should focus on identifying the consequences of Internet addiction. Second, longitudinal studies may help us understand the process of Internet addiction development and identify early warning signs of the addiction. This stream of research will help design early intervention strategies to reduce the user’s Internet addiction. Finally, the impacts of national culture on Internet addiction warrants further examination. While Internet addiction is a global phenomenon, it manifests itself differently in various cultures as the findings of this study suggest. Cross-culture comparative studies

will identify cultural dimensions that exacerbate or mitigate Internet addiction. Strategies gleaned from such studies can be highly valuable in measuring and then managing the numerous manifestations of Internet addiction.

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