ORIGINAL RESEARCH ARTICLE

Assessing The Psychometric Properties of the Internet Addiction Test (IAT) Among Indian School Students

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ABSTRACT

Background: Internet addiction is found to be a growing global problem and India is not exceptional. Adolescents are more over addicted to internet and suffering with mental confusions and deviation in behaviour. Several instruments have been developed for assessment of Internet addiction. Internet Addiction Test (IAT) is the most widely used tool to assess internet addiction, but psychometric properties of the IAT have not yet been examined in the Indian adolescence. The aim was to examine the validity and reliability of the 20-item Internet Addiction Test in Indian School Students.

Methodology: Seven hundred fifty-two students from a CBSE school of Raipur, India was randomly selected in our study. The reliability and validity of IAT was examined. Confirmatory factor analysis was used to examine the structural validity of IAT.

Results: It was found that the factor loading of the IAT varied between 0.40 and 0.82. Cronbach's alpha coefficient for the scale was found to be 905. The total correlations were calculated and had a value range from 0.406 to 0.659 for the 20 items. The psychometric properties indicate that the factor loading reveal that the test revolve around six factors (Salience, Excessive Use, Neglected Work, Anticipation, Lack of Control, and Neglected Social Life). The Cronbach's alpha is high for all the 6 components. IAT is a proper tool for evaluating internet addiction in Indian school students.

Conclusions: The findings obtained in this study indicate that overall, IAT has adequate psychometric properties for the assessment of internet addiction in Indian school students.

Keywords: Reliability, Validity, Internet Addiction Test

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INTRODUCTION

Internet has important part in our daily life. The use of the internet has a rapid growth not only in India but also worldwide in the last 10 years. Internet and Mobile association of India reported there were 42 million active internet users in urban India in 2008, compared to 5 million in 2000 as cited by Goel et al.[1] In the present scenario, Internet is used for education, entertainment, social networking, information sharing[2] and to facilitate research. On the other hand, internet can be used for pornography, excessive gaming, chatting for long hours, and gambling. In 1995 Dr. Ivan proposed the term "internet addiction" for pathological compulsive internet use.[3] Excessive use of internet is associated with various negative symptoms.[4-6]The Symptoms of internet addiction that are usually detected in clinical environments include obsession, withdrawal, and lack of control and performance deficiency.[7] The significant existence of internet in our communities has created unease over the potential presence of an internet addiction condition. Therefore, assessment of internet addiction and early intervention for reducing internet addiction are needed in Indian population. For the purpose, firstly, developing a tool for examining internet addiction in clinical and research backgrounds is a much-needed step. There are various internet addiction scales published previously. A large number of tools to measure internet addiction have been developed abroad. But few scales are developed scientifically to assess internet addiction in India. In the present scenario, 5 scales which are being used most frequently in studies for diagnosing Internet addiction or problematic Internet use.[8-9] The most commonly used are the Internet Addiction Test (IAT) of the Young, Chen's Internet Addiction Scale (CIAS) and the Internet Addiction Scale (IAS). The Internet Addiction Test (IAT) was created by Young to evaluate the existence and intensity of internet addiction in an American population sample. Satisfactory psychometric characteristics of the internet addiction test have been reported in the different countries.[10] Systemic review and Meta analysis of psychometric properties of Internet Addiction Test (IAT) was done on 25 studies including 18,421 subjects.[11] Based on meta-analysis for internal consistency, the pooled Cronbach's alpha coefficient was 0.90 (95percent confidence interval [CI], 0.89–0.91). According to test–retest analysis, the pooled Spearman's correlation coefficient was high at 0.83 (95 percent CI, 0.81–0.85), along with low publication bias. Convergent validity showed correlation coefficients of 0.62–0.84, as compared with major tools. Another Meta-analysis of the Reliability of Young's Internet Addiction test reported the overall Cronbach's alpha computed from the studies was 0.889 (95% CI 0.884-0.895).[12]

Studies have shown that cultures are associated with a variation in presentation of internet addiction. The reasons highlighted include: the limited validity in diagnostic criteria or lack of measurement equivalence: the exclusion of different cultural presentations of internet addiction symptoms in existing diagnostic criteria. It has been suggested that the instruments and scales used in the developing country may need to be modified appropriately in order to efficiently pick up the regional variations in the manifestation of a psychiatric disorder, e.g., somatic symptoms.[13] The application of internet addiction test with satisfactory psychometric properties can be effective in the recognition of internet addiction. Therefore, this is the first study undertaken among CBSE Indian students to examine the psychometric properties of an instrument that specifically assesses the internet addiction.

The objectives of our study were (1) to examine the structure validity, and reliability of the 20-item internet addiction test in Indian School Students. (2) To study the internet addiction of secondary school students.

METHODOLOGY

Participants: A sample of students enrolled in a private and government English schools in Raipur. School students were chosen as they are considered very frequent users of internet. The sample size calculation was based on the guidelines for estimating sample size for intra class correlation coefficient (ICC), for two observations, with a pre specified alpha value of 0.05, power of 0.95, and ICC value of 0.25 was 202. Participants were selected based on a priori power analysis by G∗Power computer program.[14] A total of 755 students of the CBSE School of Chhattisgarh were selected for the study through stratified random sampling. In the first stage, a list of schools was made from all the four blocks of Raipur district. In the second stage, from the list of all the schools within Raipur district 10 higher secondary CBSE schools (7 Private and 3 Government Schools) were selected. In the third stage, students were selected from different schools belonging to arts, commerce and science subject streams and data was collected. The details of the schools and number of students are reported in table-1. All 755 participants were assessed on Internet addiction test along with basic demographic information.

The students who fulfilled the following criteria were included in the study:

Inclusion criteria: Able to communicate, read, write and comprehend in Hindi and English, willing to participate.

Exclusion criteria: Not present at the time of the study, not willing to participate in the study, those with any chronic medical or psychiatric disorder were excluded.

Ethics approval: The research method of the present study was approved by Institutional Ethics Committee of Pt. Ravishankar Shukla University,

Raipur, Chhattisgarh (IEC Ref. No.:221(M)/IEC/PRSU/2019, Dated:15/02/2019). First of all, the authorities of different school were requested to give permission for collecting data from the students. After getting permission, written informed consent was taken from the parents and students. The purpose and implication of the survey were explained by the investigators. Written informed consents were obtained from all participants or caregivers of the students.

Study Tools

Internet addiction test (IAT)[15]: We used the English version of the internet addiction test (IAT) for this study. It includes 20 items that are rated on a likert scale range of 0 to 5 (0 = Never; 1 = Seldom; 2 = Occasionally; 3 = Frequently; 4 = very often, 5 = always). The internal consistency coefficient (Cronbach alpha) on this sample is 0.91. Participants can be classified into several categories and the result of 0 to 19 indicates the absence of addiction, from 20 to 39 indicates a low level of addiction and average online user, from 40 to 69 represents a moderate level of addiction, while the result of 70 to 100 assumes severe level of internet addiction.

Statistical Analysis: The scale was administered during class hours and volunteer students were required to attend the study after necessary information was given. Summary statistics mean and standard deviation, frequencies, and percentages were used for reporting demographic. We conducted confirmatory factor analysis (CFA) using the R Core Team[16-18] with maximum likelihood method to examine the factor structure in sample. The satisfactory indices of fitness of the CFA model were evaluated with the help of the Goodness of Fit Index (GFI), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean Square Residual (SRMR). Reliability was analyzed by calculating internal consistency (Cronbach alpha). One-way ANOVAs were performed to analyse whether there were statistically significant differences in the scores on the IAT based on demographic.

RESULTS

The mean age of the participants was 15.81 (.73) years. The number of participants under the age of 15-19 was 87.4%. Of the participants, 215 and 540 belong to rural and urban area, respectively. The detailed characteristics of the participants are reported in Table 1.

CFA was performed by using Maximum Likelihood Estimation Method to determine whether factorial structure of the IAT reported by researcher can be confirmed in a sample consisting of school students of Chhattisgarh. Values over 0.95 for Comparative Fit Index (CFI), Incremental Fit Index (IFI), Relative Fit Index (RFI), Normed Fit Index (NFI), Non-Normed Fit Index (NNFI) indicate goodness-of-fit and values between 0.90 and 0.94 indicate acceptable fit.[19] Standardised Root Mean Square Residual (SRMR) less than 0.05 indicate goodness-of-fit and values between 0.06 and 0.08 indicate acceptable fit.[20-23] Several types of research have suggested that all the indexes are supposed to be above 0.90 to be a good fit[24-30] as also cited in Kumar & Shrivastava.[31] Values for Root Mean Square Error of Approximation (RMSEA) should be accepted in the range of 0.05 to 1.00 the lower value is said to be a good level. Model fit was excellent in the samples (see table 3).

Table 2 shows the regression weights for CFA model. All values depicted in table for all the participants – subscales show the largest values (>0.40). As mentioned above, all factor loadings of Salience, Excessive Use, Neglect Work, Anticipation, Lack of Control, and Neglected Social Life statistically were significant ($p < 0.001$) and large. With regard to the first factor (Salience), all standardized loadings were in the range from 0.45 to 0.74. Regarding the second factor (Excessive Use), again standardized loadings were large, with a minimum of 0.40 and a maximum of 0.66. Regarding the third factor (Neglected Work), again standardized loadings were large, with a minimum of 0.51 and a maximum of 0.82. Regarding the fourth factor (Anticipation), again standardized loadings were large, with a minimum of 0.51 and a maximum of 0.82. Regarding the fifth factor (Lack of Control), again standardized loadings were large. Regarding the sixth factor (Neglect Social Life), again standardized loadings were large. Standardized factor loads, z-value, regarding items of CFA are presented in Table-2.

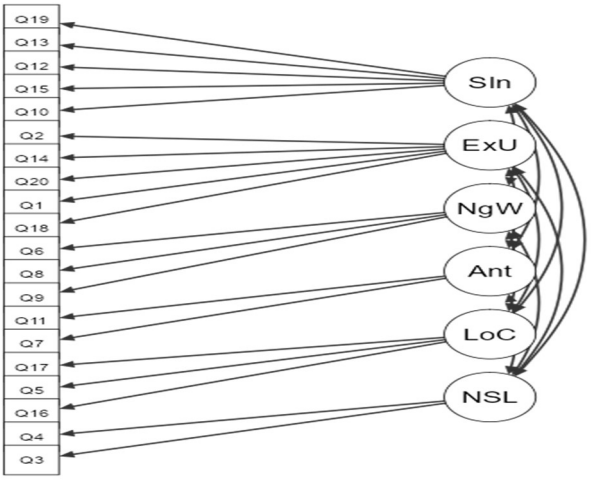
Table 1: Sociodemographic characteristics of the total sample

Variable	Participants (%)
Gender	
Male	493 (65.3)
Female	262 (34.7)
Total	755 (100)
Age	
14	15 (2)
15	220 (29.1)
16	425 (56.3)
17	85 (11.3)
18	5 (0.7)
19	5 (0.7)
Total	755 (100)
Locality	
Rural	215 (28.5)
Urban	540 (71.5)
Total	755 (100)
Marital Status	
Unmarried	755 (100)

Confirmatory Factor Analysis (CFA)

Table 2: Factor Loadings of Confirmatory Factor Analysis (CFA)

Factor & Item Number	Estimate	Standard Error	95% CI Lower	95% CI Upper	Z Value	P Value	Standard Estimate
Salience							
Q19 How often do you choose to spend more time online over going out with others?	0.748	0.0337	0.682	0.814	22.2	< 0.001	0.744
Q13 How often do you snap, yell or act annoyed if someone bothers you while you are online?	0.653	0.0347	0.585	0.721	18.8	< .001	0.657
Q12 How often do you fear that life without the Internet would be boring, empty or joyless?	0.854	0.0410	0.774	0.935	20.8	< .001	0.705
Q15 How often do you feel preoccupied with the Internet when offline, or fantasize about being online?	0.634	0.0393	0.557	0.711	16.1	< .001	0.580
Q10 How often do you block out disturbing thoughts about your life with soothing thoughts of internet?	0.419	0.0347	0.351	0.487	12.1	< .001	0.447
Excessive Use							
Q2 How often do you neglect household chores to spend more time online?	0.468	0.0444	0.381	0.556	10.5	< .001	0.398
Q14 How often do you lose sleep due to late night log-ins?	0.476	0.0347	0.408	0.544	13.7	< .001	0.485
Q20 How often do you feel depressed, moody or nervous when you are offline, which goes away once you are back online?	0.718	0.0436	0.633	0.804	16.5	< .001	0.581
Q1 How often do you find that you stay online longer than you intended?	0.467	0.0394	0.390	0.544	11.9	< .001	0.428
Q18 How often do you try to hide how long you've been online?	0.717	0.0365	0.646	0.789	19.6	< .001	0.664
Neglect Work							
Q6 How often do your grades or schoolwork suffer because of the amount of time you spend online?	0.882	0.0352	0.814	0.951	25.1	< .001	0.818
Q8 How often does your job performance or productivity suffer because of the internet?	0.851	0.0366	0.779	0.922	23.3	< .001	0.769
Q9 How often do you become defensive or secretive when anyone asks you what you do online?	0.548	0.0397	0.471	0.626	13.8	< .001	0.509
Anticipation							
Q11 How often do you find that you find yourself anticipating when you will go online again?	0.568	0.0404	0.489	0.647	14.1	< .001	0.524
Q7 How often do you check your email before something else that you need to do?	0.854	0.0403	0.775	0.933	21.2	< .001	0.814
Self-Control							
Q17 How often do you try to cut down the amount of time you spend online and fail?	0.583	0.0415	0.501	0.664	14.0	< .001	0.517
Q5 How often do others in your life complain to you about the amount of time you spend online?	0.744	0.0350	0.675	0.813	21.3	< .001	0.719
Q16 How often do you find yourself saying "just a few more minutes" when online?	0.790	0.0406	0.710	0.869	19.5	< .001	0.684
Neglect Social Life							
Q4 How often do you form new relationships with fellow online users?	0.501	0.0470	0.409	0.593	10.7	< .001	0.505
Q3 How often do you prefer the excitement of the Internet to intimacy with your partner?	0.528	0.0528	0.425	0.632	10.0	< .001	0.455



[SIn=Salience, ExU=Excessive Use, NgW=Neglected Work, Ant=Anticipation, LoC=Lack of Control, NSL=Neglected Social Life]

Figure 1: Path Diagram

Table- 3. Model Fit Indices

Test for Exact Fit					
χ^2 value 2224	Df - 155			p value <.001	
Other Fit Measures					
CFI	**TLI**	**SRMR**	**RMSEA**	**RMSEA 90% CI**	
				Lower	**Upper**
0.900	0.933	0.0799	0.103	0.108	0.138

Comparative Fit Index (CFI); Tucker-Lewis Index (TLI); Standardized Root Mean Square Residual (SRMR); Root Mean Square Error of Approximation (RMSEA)

Reliability Study

Cronbach alpha was 0.905 for the IAT. Tables 4 display Cronbach alphas when omitting items and corrected correlations between each item and the total score, respectively. These results indicate that scale

Table-4. Cronbach alpha if item is deleted and corrected item-total score correlations

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q1	46.1867	153.717	.451	.385	.903
Q2	46.0000	153.164	.432	.363	.904
Q3	45.7800	154.110	.406	.371	.904
Q4	46.3933	155.286	.453	.432	.903
Q5	46.0533	149.850	.639	.641	.898
Q6	46.0667	148.767	.652	.663	.898
Q7	46.1867	150.980	.595	.599	.899
Q8	46.0200	150.580	.574	.563	.900
Q9	46.1667	153.891	.462	.436	.902
Q10	46.1733	155.871	.456	.350	.902
Q11	46.1267	152.394	.509	.412	.901
Q12	46.0533	147.567	.613	.600	.898
Q13	46.3733	151.983	.578	.517	.900
Q14	46.3200	153.542	.519	.454	.901
Q15	46.1733	151.719	.527	.535	.901
Q16	46.1467	147.322	.658	.645	.897
Q17	46.3000	151.505	.519	.417	.901
Q18	46.1667	149.725	.616	.576	.898
Q19	46.3467	150.294	.659	.673	.898
Q20	45.9867	150.053	.513	.527	.901

has high level of reliability values. Examination of the Cronbach α values if an item is deleted showed that the removal of any of the items on the test will significantly not improve the overall Cronbach α values (table-4).

Discussion

This study aimed to evaluate the psychometric properties of internet addiction developed among young Indian adolescents. For this purpose, validity of internet addiction was tested by descriptive and confirmatory factor analysis methods; reliability was tested by internal consistencies, and split half reliability methods. Confirmatory factor analysis was performed to determine confirmation of six factorial structures in a sample consisting of Indian school students. It was concluded that six factorial structures were preserved by CFA. Widyanto and McMurran[32] carried out are search amongst adults in the U.K. and an exploratory factor analysis (EFA) exposed six factors with IAT.

Another research enrolled university students in the United Kingdom (U.K.) carried out by Widyanto, Griffiths, and Brunsden[33] revealed a 3-factor solution. In current research, a two-factor solution of the IAT was revealed among U.S. university students.[34] The IAT was also employed for evaluation of psychometric properties in different populations including French[35], Italian[36], Finnish[37], Korean[38], Malay[39], and Chinese[40].

In the Italian study, six-factor solution was found. A one-factor solution in the French and Finnish versions and five factors in the Malay version were reported. These variations in results on the psychometric properties of the IAT could be due to differences in culture, and statistical techniques being employed. Our findings indicate that internet addiction test has similar psychometric properties with its original version. The results of this study support the factorial validity of the internet addiction as a six-dimensional measure among Indian school students. The present study also replicates these findings and provides cross-cultural validation of the staging model proposed by the author. These findings provide evidence for the construct validity. The scale demonstrated high internal consistency (Cronbach's alpha – 0.905), for the internet addiction test. A Cronbach's alpha value of 0.905 for a scale is considered as a good indicator of internal consistency of the scale. Hence, it can be presumed that the internet addiction test has good internal consistency and the items of each factor assess similar characteristics. When the Cronbach's alpha values were compared with recent research,[41] for the internet addiction test in the study were similar. Our study has some limitations. First of all, it was performed in a sample consisting of only school students. Some item of the scale was low factor load and total item correlation. There was an agreement that this item could not be fully understood by participants. In this study, our targeted population was school students. Therefore, generalizing findings to other teenage or adult populations might not be recommended.

Conclusion

The findings of this study indicate that overall, IAT has adequate psychometric properties for the assessment of internet addiction in an Indian population. Further work is required to examine psychometric properties of the internet addiction test in samples who are other than school students. In this study, reliability of the scale was examined by inner consistency. Determining reliability of the scale can be suggested by test-retest method in future studies.

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