

Psychometric Evaluation of the Generalized Problematic Internet Use Scale 2 in an Indonesian Adolescents' Sample

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Abstract: Internet users in Indonesia has increase and become challenged associated with symptoms of internet addiction. Teenagers are the most vulnerable group to have Problematic Internet Use (PIU). This study's main purpose was to examine the psychometric properties of Generalized Problematic Internet Use Scale 2 (GPIUS 2) in an Indonesian adolescents' sample. The second aim was to investigate the concurrent validity of the Indonesian version to provide evidence for the validity. The study involved a cross-sectional online survey design with 300 adolescents with an age range of 15-18 years ($M = 16$; $SD = 0.94$) of which 70.7% ($n = 202$) were female adolescents. GPIUS2 contains fifteen Likert-type items rated on an 8-point scale which modified into 5-point Likert from "strongly disagree" to strongly agree." GPIUS 2 was adapted to Bahasa Indonesia using backward translation techniques. Structural Equation Modeling (SEM) (i.e., Confirmatory Factor Analysis (CFA) was performed to evaluate the psychometric properties of the GPIUS-2. Internal consistency for both the subscales and the total scale had been assessed by calculating the alpha coefficients. The results provide support for the original factorial structure similar by Caplan (2010) with five factor solution models. Results indicated that the model fit the data well, $\chi^2 = 230.697$; $d.f = 80$; $p < 0.001$; $CFI = 0.91$; $TLI = 0.92$; $RMSEA = 0.07$. The study also found good reliability for the global scale ($\alpha = 0.83$). Further research needs to explore models with relevant psychological constructs in revealing problematic internet behavior in adolescents. Longitudinal studies, and in-depth interviews are also very important for future studies to present more comprehensive data. Expanding the age of respondents to obtain comparisons between generations is something that can be done considering Internet penetration has entered all layers of the age generation.

1 INTRODUCTION

Based on the survey results of the Asosiasi Penyelenggara Jasa Internet Indonesia (2020), internet users in Indonesia increased to 196.71 million people or 73.7% of the total population in Indonesia, and smartphones remain the most frequently used devices to access the internet (95.4%). In 2019, in Indonesia, 25.2% of children aged 5-9 years and 66.2% of children aged 10-14 were active internet users (Asosiasi Penyelenggara Jasa Internet Indonesia, 2020). Internet or digital technology can positively impact children and adolescents, including improving literacy and math skills, increasing socialization skills, gaining intellectual benefits such as developing problem-solving and critical thinking skills, increasing

imagination, art, and modeling abilities (Undiyaundeye, 2014). Furthermore, Mills (2016), it is explained that the use of the internet can improve cognitive abilities such as absorbing information faster. These abilities will help individuals to solve problems. Vošner et al. (2016) state that internet users become more active and engaged in using the internet because of their interactions. Meanwhile, Omar et al. (2014) states that internet users experience self-development, broad exposure, relaxation, and exchange of information on a global scale.

Problematic internet use has become challenged associated with symptoms of addiction (Chang et al., 2015; Simcharoen et al., 2018; Spada, 2014) which include worldly, compulsive, and behavioral excessively controlled or uncontrolled in connection with internet access that leads to physical and mental

disorders (Mamun & Griffiths, 2019). In addition, excessive internet use also harms family relationships, social and academic life (Machimbarrena et al., 2018). Several variables are associated with an increased risk of internet-related problems, especially cyberbullying. Excessive internet use also results in individuals losing control, feelings of anger, stress symptoms, social isolation, family conflict, anxiety, and depression (Machimbarrena et al., 2018). Furthermore, according to Alam et al. (2014) uncontrolled internet use is associated with other pathological conditions such as depression, loneliness, and social anxiety. Some of the problems caused by excessive internet use include behavioral such problems as late-night internet use, social isolation, messy sleeping hours, decreased academic performance (Akar, 2015). Then physical problems such as migraines or headaches, reduced sleep hours, and back pain due to prolonged internet use (Zheng et al., 2016). Excessive internet use can also lead to psychological problems such as compulsive behavior and depression (Barthakur & Sharma, 2012).

Problematic internet use is also considered a symptom of one type of internet addiction. Internet addiction is a broad term to cover various kinds of addictions mediated by electronic media. These addictions include, for example, shopping, virtual sex, gaming, social network services (SNS), smartphones, online gambling, cyber-connections, and file downloading – i.e., electronic services that provide positive stimulation for users (Kačániová & Bačiková, 2016; Mihajlov & Vejmelka, 2017; Rebisz & Sikora, 2016; Wasiński & Tomczyk, 2015). All types of internet addiction mentioned above fall into problematic internet use (Vejmelka et al., 2017).

Teenagers are the majority age group of internet users and the most vulnerable group to have Problematic Internet Use (PIU); about 50% of teenagers in South America use the internet. In contrast, in the UK, America, and other Asian countries, adolescent internet users almost reach 80%. The prevalence of Problematic Internet Use among adolescents ranges from 0.8% (in high school students in Italy) to 26.7% (in adolescents in Hong Kong) globally. Factors that cause increased levels of Problematic Internet Use in adolescents include low social support, low levels of satisfaction with academic performance, insecure attachment styles, childhood violence experiences, poor parent-adolescent relationships, lack of love from family. And homesickness (Chandrima et al., 2020). Yen et al. (in Chao et al., 2020) argue that low parental monitoring is associated with PIU in adolescents. A

study conducted by Chao et al. (2020) on high school students in Taiwan revealed that cyberbullying, the use of internet pornography, internet fraud, and community bonds affect the level of PIU in adolescents. In Ardiansyah's study (2018), Problematic Internet Use (PIU) has a negative correlation with self-esteem, meaning that the lower the level of self-esteem of students at the Islamic University of Indonesia, the higher the level of self-esteem Problematic Internet Use. Furthermore, in a study conducted on high school students in Korea, internet addiction was associated with poor mental health conditions (Yoo et al. in Kuss & Lopez-Fernandez, 2016). Furthermore, Anggunani and Purwanto (2019) have found a positive relationship between academic procrastination and Problematic Internet Use, which means that the higher the level of problematic internet use, the higher the level of academic procrastination.

One of the first measuring tools used to measure Problematic Internet Use is The Generalized Problematic Internet Use Scale (GPIUS). This measuring instrument is used to measure cognitive and behavioral symptoms associated with PIU from various perspectives. There are two versions of this measuring instrument, namely the first and second versions. The second version is the most used these days. The Generalized Problematic Internet Use Scale 2 was compiled by Caplan, (2010) based on the pathological aspects of internet use which include a preference for online social interaction, mood regulation, deficient self-regulation consisting of cognitive preoccupation, and compulsive internet use, and adverse outcomes. Caplan (2010) defines problematic internet use as maladaptive thoughts and behaviors related to internet use that negatively affect social, education, and occupationally.

This measuring instrument has been validated and adopted in several studies, such as in Spain with 1,021 subjects and Cronbach's alpha reliability of 0.91 (Gámez-Guadix et al., 2013). Furthermore, in Italy, the number of subjects was 371, with a Cronbach alpha range from 0.78-0.89 (Fioravanti et al., 2013). Again, Germany using two types, namely the online version and the paper-based version, with a total sample of 1041 subjects for the online version and 841 subjects for the paper-based version. In this study, the reliability obtained was 0.85 (Barke et al., 2014). Then adaptation of this scale was also carried out in Portugal with a reliability range from 0.78 (for the Negative Outcomes subscale) to 0.86 (for the Deficient Self-Regulation subscale) (Pontes et al., 2019). Furthermore, adaptation was also carried out in France with 563 students and Cronbach's alpha of

0.85 (Laconi et al., 2014).

In Asia, this scale was used in India to measure Problematic Internet Use in engineering college students with 3,973 subjects. The study found that older age, more time spent online per day, and internet use for social networking are associated with risk—increase in PIU (Kumar et al., 2019). In Indonesia, this measuring tool was used in Anggunani and Purwanto (2019) research to determine the relationship between problematic internet use and academic procrastination in undergraduate students. Furthermore, this scale is also used in the study conducted by Ardiansyah (2018) to find out the relationship between self-esteem and problematic internet use in Indonesian undergraduate students.

Based on the explanation above, Indonesia, with an increase in Internet users, especially among teenagers, is a potential location for research on the exploration and impact of the internet on behavior. Furthermore, adaptation and validation of measuring instruments are initial studies that will help the further investigation. Thus, the present study aims to adapt and validate the GPIUS 2 to Indonesian adolescents.

2 METHOD

2.1 Participants

A total of 300 adolescents participated in this study with an age range of 15-18 years ($M = 16$; $SD = 0.94$) of which 70.7% ($n = 202$) were female adolescents. Data collection is done online using the google form link. We ensured that there was no duplication of data by providing codes and settings in the application to prevent repeated filling. Besides, those participants were asked to upload informed consent. All participants have explained this study and filled out an informed consent. For participants who are less than 17 years old, written consent from their parents/legal guardians is required.

2.2 Measures

Generalized Problematic Internet Use Scale 2 (GPIUS 2) developed by (Caplan, 2010). GPIUS2 contains fifteen items with five subscales, namely Preference for Online Social Interaction (POSI; 3 items; e.g., “I prefer online social interaction over face-to-face communication.”), Mood regulation (MR; 3 items; e.g., “I have used the Internet to talk with others when I was feeling isolated.”), Cognitive preoccupation (CP; 3 items; e.g., “I would feel lost if I was unable to go online.”), Compulsive Internet use

(CU; 3 items; e.g., “I find it difficult to control my Internet use.”) and Negative outcomes (NO; 3 items; e.g., “My Internet use has made it difficult for me to manage my life”). GPIUS2 contains fifteen Likert-type items rated on an 8-point scale which we modified into 5-point Likert from “strongly disagree” to strongly agree.” We adapted GPIUS to Bahasa Indonesia using backward translation techniques (Brislin, 1970).

2.3 Instruments Adaptation Procedures

We adapted GPIUS to Bahasa Indonesia using a forward-backward translation technique (Brislin, 1970). The adaptation process is carried out by first translating GPIUS 2 into Bahasa Indonesia (forward translation), which is carried out by qualified clinical psychologists and researchers with a PhD, and proficient in English. Then after the forward translation process was carried out, the results of the GPIUS 2 translation were translated back into English (backward translation) by a bilingual psychologist and professional translator. After getting the backward translation version, the researcher then made an expert judgment to assess whether the item was appropriate both in content and style. At this stage, the expert also gives certain notes if the item is still not quite right. After that, the item will be revised by the researcher to be used as the final item. The questionnaire was, then, administered to 10 adolescents to detect if there were some understanding issues, discussed with them each item. This procedure led to minor wording adjustments in the final form of the measure.

2.4 Data Analytic Strategy and Statistical Analysis

Generalized Problematic Before statistical analysis was carried out, the data was cleaned through two stages, namely in the initial phase, checking for missing values with a threshold of 10% on the information that had been collected. The second phase is further analysis using: (1). Univariate normality of all 15 items of the GPIUS2, (2). Univariate outliers, and (3). Multivariate outliers among the dataset.

The models' parameters were estimated using Maximum Likelihood. Goodness-of-fit was evaluated using the following descriptive indices: (1) Comparative Fit Index (CFI) between 0.90-0.95, (2) Root Mean Square Error of Approximation (RMSEA) values equal to or less than 0.08, and (3)

Tucker-Lewis Fit Index (TLI) between 0.90-0.95 (Hu & Bentler, 1999; Schermelleh-Engel et al., 2003) to ensure the adequate fit of the measurement model.

Structural Equation Modeling (SEM) (i.e., Confirmatory Factor Analysis (CFA) was performed to evaluate the psychometric properties of the GPIUS-2. Internal consistency for both the subscales and the total scale has been assessed by calculating the alpha coefficients. All the analyses were performed using IBM SPSS Amos v.21.

3 RESULT AND DISCUSSION

Table 1 shows descriptive statistics for the GPIUS2 items. First, univariate distributions of the 15 items were examined for assessment of normality. As for the univariate normality, no item of the GPIUS2 had

absolute Skewness >3.0 and Kurtosis >8.0 (Kline, 2015), thus warranting univariate normality of the study's primary measure. Next, a standardized composite sum score of the GPIUS2 using all 15 items was created to screen for univariate outliers. Participants were deemed univariate outliers if they scored ± 3.29 standard deviations from the GPIUS2 z-scores. This threshold was chosen because it includes around 99.9% of the normally distributed GPIUS2 z-scores (Field, 2013). Finally, the data were also screened for multivariate outliers using Mahalanobis distances and the critical value for each case based on the chi-square distribution values, which resulted in no further exclusion of participants.

Descriptive statistics for GPIUS2 subscales and total scores are reported in **Table 2**. The correlation coefficients for the GPIUS2 items are shown in **Table 3**.

Table 1: Generalized Problematic Internet Use Scale 2 Items Descriptive Statistics.

Item wording	M	SD	Skewness	SE	Kurtosis	SE	Corrected Item-Total Correlation
I prefer online social interaction over face-to-face communication	2.13	0.05	0.72	0.14	0.36	0.28	0.37
I have used the Internet to talk with others when I was feeling isolated	2.58	0.04	-0.06	0.14	-0.32	0.28	0.44
When I haven't been online for some time, I become preoccupied with the thought of going online	2.35	0.04	0.12	0.14	-0.33	0.28	0.45
I have difficulty controlling the amount of time I spend online	2.60	0.05	-0.15	0.14	-0.35	0.28	0.55
My Internet use has made it difficult for me to manage my life	2.46	0.05	0.11	0.14	-0.49	0.28	0.50
Online social interaction is more comfortable for me than face-to-face interaction	2.05	0.05	0.65	0.14	0.32	0.28	0.42
I have used the Internet to make myself feel better when I was down	2.91	0.04	-0.37	0.14	-0.16	0.28	0.34
I would feel lost if I was unable to go online	2.39	0.05	0.01	0.14	-0.46	0.28	0.42
I find it difficult to control my Internet use	2.53	0.05	0.13	0.14	-0.60	0.28	0.49
I have missed social engagements or activities because of my Internet use	2.24	0.04	0.31	0.14	0.03	0.28	0.47
I prefer communicating with people online rather than face-to-face	2.08	0.04	0.70	0.14	0.56	0.28	0.49
I have used the Internet to make myself feel better when I've felt upset	2.95	0.04	-0.39	0.14	0.38	0.28	0.39
I think obsessively about going online when I am offline	2.21	0.05	0.35	0.14	-0.31	0.28	0.52
When offline, I have a hard time trying to resist the urge to go online	2.25	0.04	0.31	0.14	-0.06	0.28	0.46
My Internet use has created problems for me in my life	2.15	0.04	0.44	0.14	0.31	0.28	0.41

Table 2: GPIUS2 scales and total score: Descriptive Statistics.

GPIUS Scale	Mean	SD
Preference for Online Social Interaction (POSI)	6.26	2.13
Mood regulation (MR)	8.44	1.75
Cognitive preoccupation (CP)	6.94	1.94
Compulsive Internet Use (CIU)	7.38	1.85
Negative Outcomes (NO)	6.85	1.79
GPIUS Total Score	35.86	6.27

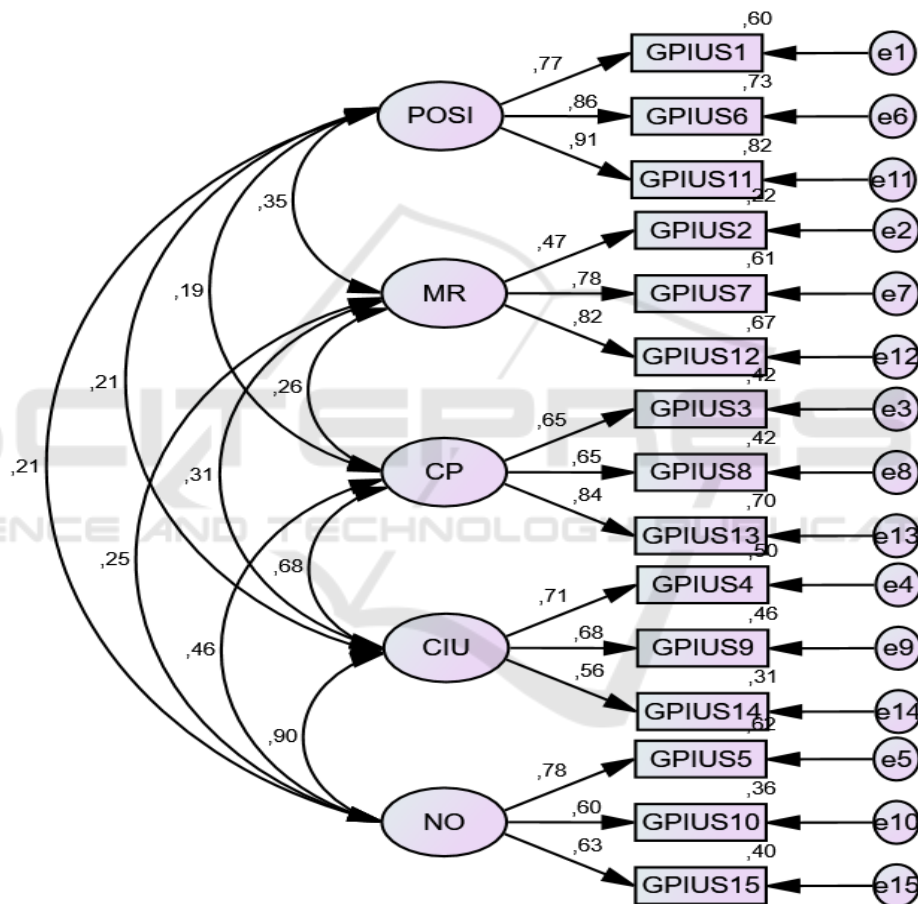


Figure 1: Confirmatory Factor Analysis GPIUS 2.

Internal consistency for both the subscales and the total scale has been assessed by calculating the alpha coefficients. In terms of reliability, internal consistency Cronbach's Alpha was .88 (95% C.I.= .86 - .90) for POSI scale; $\alpha = .70$ (95% C.I. = .64 - .76) for Mood Regulation scale; $\alpha = .75$ (95% C.I. = .70 - .80) for Cognitive Preoccupation scale; $\alpha = .68$ (95% C.I. = .61 - .74) for Compulsive Internet Use scale; and $\alpha = .70$ (95% C.I. = .64 - .76) for Negative

Outcome scale. For the whole, GPIUS2 scale's reliability was .83 (95% C.I.= .80 - .86). That value did not increase when an item was deleted, and all item-corrected total correlations were above .30.

As shown in **Figure 1**, a five-factor model was tested by applying a confirmative approach. Results indicated that the model fit the data well, $\chi^2 = 230.697$; d.f= 80; $p < 0.001$; CFI = 0.91; TLI = 0.92; RMSEA = 0.07.

Table 3: Correlation coefficients for the GPIUS2 items.

ITEM 1	ITEM 2	ITEM 3	ITEM 4	ITEM 5	ITEM 6	ITEM 7	ITEM 8	ITEM 9	ITEM 10	ITEM 11	ITEM 12	ITEM 13	ITEM 14	ITEM 15	
ITEM 1															
ITEM 2	.35**	1													
ITEM 3	.13*	.28**	1												
ITEM 4	.12*	.24**	.32**	1											
ITEM 5	.084	.18**	.19**	.53**	1										
ITEM 6	.67**	.35**	.19**	.16**	.08	1									
ITEM 7	.17**	.33**	.12*	.17**	.22**	.22**	1								
ITEM 8	-.04	.13*	.43**	.26**	.28**	.03	.11	1							
ITEM 9	.07	.13*	.16**	.53**	.53**	.13*	.13*	.28**	1						
ITEM 10	.15**	.08	.18**	.43**	.42**	.20**	.08	.22**	.44**	1					
ITEM 11	.70**	.39**	.22**	.17**	.12*	.78**	.26**	.11	.12*	.23**	1				
ITEM 12	.17**	.36**	.09	.19**	.17**	.17**	.66**	.15*	.17**	.14*	.24**	1			
ITEM 13	.11	.24**	.54**	.38**	.25**	.09	.13*	.54**	.25**	.28**	.14*	.18**	1		
ITEM 14	.04	.16**	.36**	.34**	.25**	.03	.11	.43**	.36**	.34**	.07	.19**	.59**	1	
ITEM 15	.07	.09	.22**	.34**	.55**	.11	.05	.25**	.39**	.35**	.13*	.08	.25**	.22**	1

** . Correlation is significant at the 0.01 level (2-tailed).
 * . Correlation is significant at the 0.05 level (2-tailed).

This study present a psychometric properties of the GPIUS2 among Indonesian teenagers. The results provide that GPIUS 2 is a valid measure of generalized problematic Internet use, since confirmatory factor analysis has shown adequate fit. The results provide support for the original factorial structure similar by Caplan (2010) with five factor solution models namely Preference for Online Social Interaction, Mood Regulation, Cognitive Preoccupation, Compulsive Internet Use, and Negative Outcome. We found good reliability for the global scale ($\alpha = 0.83$).

On the basis of the confirmatory analysis results, the Indonesian version of the GPIUS2 appears to be a valid measure of GPIUS cognition, behaviors, and outcomes. It is also suitable for measure involving teenagers' sample.

Based on a theoretical perspective, the results of this study show that there is a strong relationship between individual preferences in online activities and the manifestations in their thoughts and feelings. This finding also reflects the construct of GPIUS2 which focuses more on the unique context of Internet communication. The role of cognitive symptoms in Preference for Online Social Interaction Caplan (2010) is a systematic factor that plays a role in the development of negative outcomes, so this can help further research on the topic of Problematic Internet Use (PIU). Further, the GPIUS2 presents an important approach in evaluating PIU from a multidimensional perspective that will help to understand more deeply the etiology of problematic Internet use.

This study also builds an empirical understanding of the GPIUS2 model in the context of culture, especially the Indonesian population.

4 CONCLUSION

The study concluded that the Generalized Problematic Internet Use Scale 2 (GPIUS 2) is a valid and reliable instrument for in an Indonesian adolescents. The study provided support for the original factorial structure similar by Caplan (2010) with five factor solution models namely Preference for Online Social Interaction, Mood Regulation, Cognitive Preoccupation, Compulsive Internet Use, and Negative Outcome.

Moreover, this study has several limitation that deserve to be addressed. First, the design of this study is cross-sectional so it has not been able to find a definite causal relationship. Further research needs to explore models with relevant psychological

constructs in revealing problematic internet behavior in adolescents. Longitudinal studies, and in-depth interviews are also very important for future studies to present more comprehensive data. Second, the data from this study are based on self-report and use an online form. This can have implications for the emergence of bias in data entry. This can then be minimized by using other complementary data such as information from parents and teachers in the form of questionnaires and interviews. Expanding the age of respondents to obtain comparisons between generations is something that can be done considering Internet penetration has entered all layers of the age generation.

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