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## Exploring internet addiction on adolescents

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**Abstract.** Internet addiction has become an issue of concern. Reality in the field, individuals are not aware of the condition of addiction to the Internet they experienced. The study measured the level of Internet addiction in adolescents. The study involved 175 teenagers scattered throughout Indonesia. Data were analysed used RASCH Model and Network Psychometrics. The results showed that most adolescents were at high, medium and low levels of Internet addiction. Of the 175 persons, there are 20 persons that are Outliers or Misfits. The analysis of network psychometry shows that the interaction between factor structure is superb. Based on the analysis of network psychometry also seen a positive and negative partial correlation of each item. The findings from this study can be an important input for counselors in establishing appropriate treatment to overcome the Internet addiction problem experienced by adolescents in Indonesia.

### 1. Introduction

The Internet plays an important role in everyday life[1]. What is interesting from the development of the Internet is that in a short time, the Internet has introduced many new things in the community [2]. The development of the Internet in Indonesia has shown a significant development based on data from the Association of Internet Service Providers Indonesia (APJII), at the end of 2006 alone. The number of Internet users reached 25 million. In 2011 already reached 55 million people [2, 3]. The Internet as a medium of communication allows unlimited information access. Before getting to know the Internet media, human need cost and time long enough in looking for information [3]. In addition, according to Sisson and Pontau [3], The Internet can offer a convenience (convenience) that cannot be found in other information channels. The forms of convenience include access speed as well as the availability and diversity of the information presented. So, it is very reasonable if, then the needs of the Internet become a majority requirement for the lives of many people lately. With the exponential increase of Internet usage in life and easy internet access, excessive Internet usage, in adolescents has been a concern over recent years. Internet addiction is becoming a serious problem worldwide, for teenagers [4]. A study of 853 adolescents showed that 97.6% of them were classified as Addicted [5]. In the United States, studies were conducted on adults and it was revealed that 0.7% of respondents were Internet addicted [6], And 25% of teenagers experience Internet addiction [7, 8]. Other studies have shown that 11.67-19.8% of adolescents are identified as being addicted [9]. Based on the findings from the study, it is showed that juveniles are vulnerable as Internet addicts.



Overuse of the Internet can be attributed to problematic behavior can even lead to addiction [10-16]. Internet addiction is defined as the inability to control the use of the Internet, resulting in functional distractions in everyday life [17-19]. Addicted to the Internet in question are addicted to games, cybersex addiction, online social networking addiction [20]. One of the main factors a person is addicted to the Internet is the unmet fulfillment of psychological needs in life [21, 22]. The Internet sources to escape and avoid [23]. A substantive body of work has determined that stressful life events are an important risk as a youth Internet addiction factor [23-26]. Other serious issues related to Internet addiction among teenagers include refusal to attend school and mental health issues such as loneliness, low self-esteem, sleep inadequacy, insomnia, anxiety, and depression [5, 27]. Excessive use of the Internet is also found to damage family relationships, self-esteem, life satisfaction [4, 28-31], academic achievement [31, 32], and semantic verbal fluency [33].

Based on the exposure, then the early detection of adolescents with Internet addiction is necessary [9]. To detect the Internet addiction required the right instrument. There are many instruments that have been used including Internet Addiction Scale (IAS) [34], Internet Addiction Test (IAT) [35], Internet Addictive Disorder (IAD) [36], Internet Addiction Disorder Diagnostic Criteria (IADDC) [19], Young Internet Addiction Test (IAT) [37], Chen Internet Addiction Scale (CIAS) [9], Compulsive Internet Use Scale (CIUS) [38], Griffith Addiction Components Criteria (GAC) [19]. In this study, we used Chen Internet Addiction Scale (CIAS) to measure the rate of Internet addiction.

## 2. Method

The participant involved in this study as 175 adolescents in Indonesia. Sample used simple random sampling. The instrument contains 26 items used 4-point Likert rating scale. It measures the level of internet addiction used Chen Internet Addiction Scale (CIAS) [9]. The results of data collection were analyzed used Rasch Model, which is focused on estimating quality test item, test information function, and quality person. The software WINSTEPS 3.73 was used to generated and examine data collection. And used Network Psychometrics to description of nodes. The research data set can be accessed in osf.io. Open Science Framework.

## 3. Result and Discussion

### 3.1 DASS Quality Test for Teens

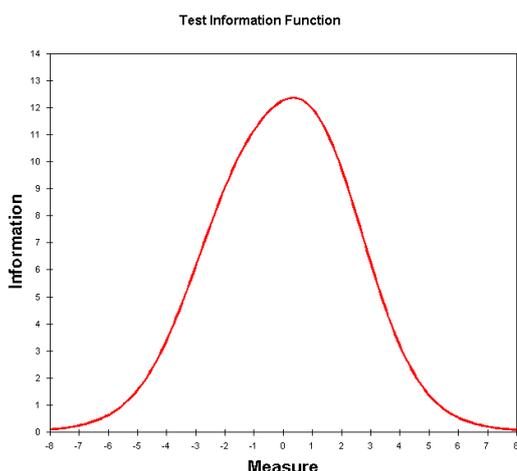
There are four aspects of testing performed to test the instruments of Internet addiction, including (1) reliability and separation index, (2) dimension test, (3) fit and misfit items, and (4) test information function[39].

**Table 1.** Summary of quality test items

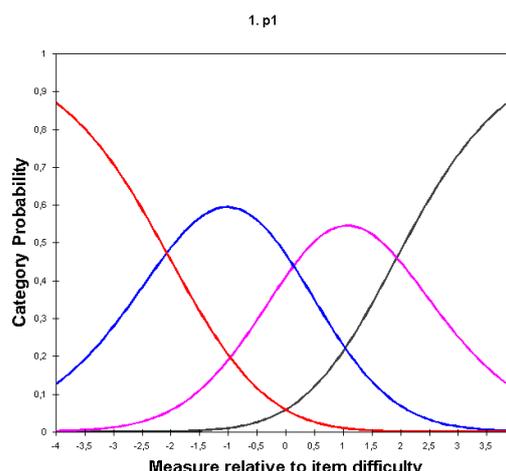
<b>Estimation</b>	<b>Values</b>
Item Reliabilities	.97
Separation Index of Item	5.93
Mean OUTFIT MNSQ	1.00
Raw variance explained by measures	34.8 %
Raw variance unexplained by measures	65.2 %
Observed average (Label 1)	-1.23
Observed average (Label 4)	+1.08

First, we review the reliability of the internet addiction instrument. The estimation results in Table 1 show that the reliability item is (.97), which means the consistency of the Internet addiction instrument is at an excellent level. This is also supported by the value of the separation index that can set items into five sections, from very low to very high. Next, looking for the observed value is to note that teenagers are not troubled in finding out the right answer option (Label 1) and wrong (Label 4). This is evidenced by the observed average value of -1.23 logit (low) to +1.08 logit (highest). Second, on unidimensional estimation through principal component analysis (PCA) identify the value of crude variance explained by size of 34.8%. This shows that the unidimensional condition of the Internet addiction instrument has been reached (> 15%); or the items involved in the measurement of a good

Internet addiction instrument. Third, the categorization of fit and misfit items on the Internet addiction instrument can be shown by comparing the OUTFIT MNSQ value of each instrument item with an average OUTFIT MNSQ value of +1.00 logit, showing that the outfit value of the mean square is the middle squared 1.0 or ideal range ( $0.5 > \text{MNSQ} < 1.5$ ). The facts of the 26 items tested to adolescent are 3 items in the misfit internet addiction instrument, item no. 21 (+1.71 logit), no. 6 (+1.62 logit), no. 12 (+1.52 logit), and for the other 23 items stated as appropriate (Item OUTFIT MNSQ  $< +1.44$  logit). Fourth is to identify the extent to which information can be measured by the internet addiction instrument as shown in Figures 1 and 2.



**Figure 1.** Test Information Function (TIF)



**Figure 2.** Category Probability

In Figure 1 it is known that the output of information collected by the Internet addiction instrument is at a maximum level for teenagers with high, medium and low ability. While the instruments of Internet addiction to reveal specific information for teens that are at very high and very low levels are less efficient. This is also supported through Figure 2 where the probability of a choice of correct and false answers revolves around high, medium, and low levels.

*3.2 Youth Performance in Internet addiction instruments based on Rasch Fit Statistics*

The ability of teenagers to work as an Internet addiction instrument can be evaluated through (1) individual size and (2) individual suitability. Both are used as a basis for determining teenagers who have high Internet addiction, moderate and low.

**Table 2.** Summary of quality person

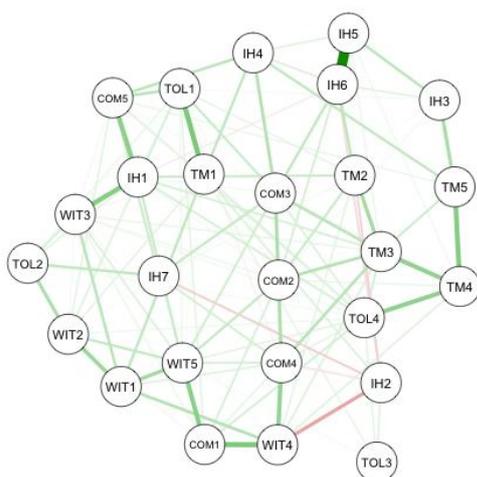
Estimation	Values
Person Reliabilities	.85
Separation Index of Person	2.37
Mean Person	.06
Mean OUTFIT MNSQ	1.00
Cronbach Alpha (KR-20) Person raw score reliability	87.0 %

**Table 3.** Misfit

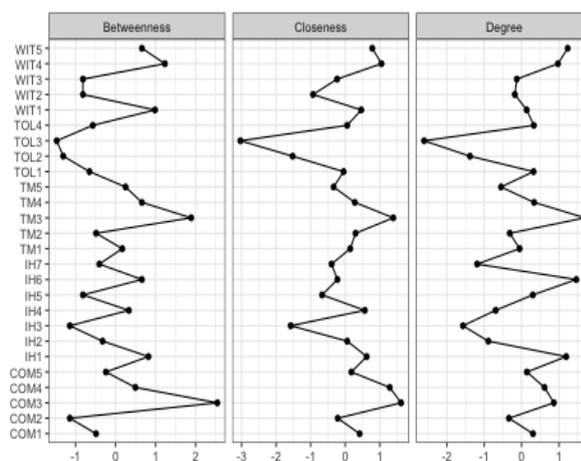
#Student	OUTFIT MNSQ						
080	2.13	121	1.80	008	1.67	039	1.55
083	1.99	138	1.72	014	1.67	108	1.54
063	1.98	031	1.76	017	1.59	094	1.55
145	183	167	1.69	164	1.48	092	1.53
087	182	015	1.69	009	1.57	171	1.51

In general, the ability of teenagers to work on an above-average Internet addiction instrument (+.07 logit > 0,00 logit). In other words, most teenagers often or sometimes are in a condition of Internet addiction such as opening Youtube, Instagram, Facebook, Email. Google even used to play games that use Internet data. Reliability teenagers in answering good instruments; as well as the interaction between individuals and items ( $\alpha = 0.87$ ), this shows the interaction of teenagers with excellent items [40]. We also explore teenagers that provide answers not in accordance with the given instrument (Misfit), of the 175 teenagers, there are 20 teenagers that have  $OUTFIT\ MNSQ > +1.48$  logit. Misfit teenagers are presented in Table 3.

The results show that adolescents with code 080 (+2.13 logit) are teenagers that have the highest ability to work as an Internet addiction instrument among 174 other teenagers. By contradiction, code 025 (.25 logit) is the teenager with the lowest ability in the Internet addiction instrument among 174 other teenagers, this means teenage code 025 is at the lowest Internet addiction rate of other teenagers. Based on the results in Table 3 states that the tendency of adolescents to answer strongly agrees and somewhat agrees on the instrument of Internet addiction, so it can unfold youth Internet addiction is at a high level, medium, and low. Furthermore, the network conditions of the factor structure of the Internet addiction are graphed as below:



**Figure 3.** A Network Model interaction between the factor structure of Internet addiction.



**Figure 4.** Closeness, betweenness, and degree centrality of the three networks describe of the factor structure of Internet addiction.

Figure 3 shows many items have green edges show, that mean have the positive partial correlation, and any red edges show, that mean have negative partial correlation [41, 42]. Base meaningful connections, such as “interaction with family members (IH5)” being linked to “recreational activities (IH6)”. The interaction between factor structure is very well [41]. However, any node (TOL3) is conditionally independent given node IH2. Figure 4 was made using centrality plot and shows the resulting centrality of all three networks shown in figure 3. All measures show how important nodes are in a network, with higher values indicating that nodes are more important.

**Table 4.** Description of nodes shown in Figure 3 and Figure 4

Nodes	Description
TM1, TM2, TM3, TM4, TM5	Time management problem
WIT1, WIT2, WIT3, WIT4, WIT5	Withdrawal symptoms
TOL1, TOL2, TOL3, TOL4	Tolerance symptoms
IH1, IH2, IH3, IH4, IH5, IH6, IH7	Interpersonal & Health Problems
COM1, COM2, COM3, COM4, COM5	Compulsive symptoms

#### 4. Conclusion

Based on our research, we emphasize that (1) Internet addiction experienced by the majority of adolescents in Indonesia is at a high, moderate, and low level, (2) the Chen Internet Addiction Scale (CIAS) measurement property is adequate. And in terms of network, psychometrics illustrated that the interaction between factor structure is very good. In principle, the quality of Chen Internet Addiction Scale (CIAS) that researchers give to teens is very satisfying. In terms of reliability, index separation, and unidimensional instruments are fully adequate. However, some aspects of Chen Internet Addiction Scale (CIAS) need to be focused on several things, including (1) on inappropriate items or outliers, and (2) a measurement information function that only shows optimal measurements for adolescents with high, low but less effective is used for teenagers who have the very low ability and very high. The three items that outliers need to consider or remove from Chen Internet Addiction Scale (CIAS) are item number 6, 12, 21, and for the other 23 items stated accordingly. Furthermore, in terms of measuring the ability of adolescents in Chen Internet Addiction Scale (CIAS) scene 20 respondents who outlier. Teenagers that outlier may be inaccurate, there are traces of cheating, or answer by guessing. In addition, 155 adolescents can be calculated for their ability to work on Chen Internet Addiction Scale (CIAS). And the tendency of teenagers to answer Chen Internet Addiction Scale (CIAS) is in a condition that strongly agrees and somewhat agrees, so it can unfold youth Internet addiction in Indonesia is at a high, medium, and low.

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