Validation of the Indonesian Version
of the Short Problematic Internet Use Test (SPIUT)
Using Rasch Analysis

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Abstract. The Short Problematic Internet Use Test (SPIUT) is a brief assessment instrument designed to measure an individual's problematic internet use (PIU), offering an efficient method to screen for excessive internet use behaviors. The purpose of the current study was to evaluate the validity and reliability of the Indonesian-language version of the SPIUT by applying Rasch model analysis. Data were analyzed using the Rasch model analysis with Winsteps 3.73 software. This involved assessing differential item functioning, rating scale functionality, and item-fit statistics. Result showed that the SPIUT Indonesian version had good item reliability (α= .95), and fairly consistent on person reliability (α= .63). The practical implications of this study are significant for the measurement of PIU, with wide-ranging impacts on research. The theoretical implications relate to the advancement of measurement theory, as this study contributes to enhancing the validity and reliability of the instrument through the application of Rasch analysis.

Keywords: problematic internet use, Rasch analysis, validation, adaptation, Indonesia

1 Introduction

The pervasive use of the internet has become a defining characteristic of contemporary society, particularly among adolescents. While the internet offers numerous benefits, including access to information, social connectivity, and educational resources, it also poses risks, notably the potential for problematic internet use (PIU) [1]. There are several terms used to describe problematic internet use, including "internet addiction", "compulsive internet use", and "pathological internet use" [2-4]. PIU is characterized by excessive or poorly controlled preoccupations, urges, or behaviors regarding internet use that lead to impairment or distress [5]. Addressing PIU is critical as it can have significant negative impacts on mental health, sleep problem, academic performance, social relationships, and wellbeing [6-8].

Despite the growing concern over PIU, there is a notable gap in validated measurement tools tailored to the Indonesian adolescent population. Most existing instruments have been

developed in Western contexts [9,5], and may not accurately capture the cultural nuances and specific behaviors associated with internet use in Indonesia. Therefore, there is a pressing need for an instrument that can reliably and validly assess PIU among Indonesian adolescents.

Meanwhile, there have been efforts to adapt measurement tools for problematic internet use in Indonesia; however, the number of items used remains relatively lengthy. Siste et al. [10] conducted a validation study of the Indonesian Internet Addiction Test among adolescents, utilizing 20 items to assess psychological dependence, compulsive use, and withdrawal symptoms. Adlina [11] adapted the Generalized Problematic Internet Use Scale 2 (GPIUS2), which measures Preference for Online Social Interaction, Mood Regulation, Cognitive Preoccupation, Compulsive Internet Use, and Negative Outcomes, with 15 items. Agriyani & Widyastuti [12] adapted the Problematic Internet Use Questionnaire (PIUQ) to measure Obsession, Neglect, and Control Disorder with 18 items. All studies employed the Classical Test Theory (CTT) approach, specifically Confirmatory Factor Analysis (CFA).

This study aims to adapt and validate the Short Problematic Internet Use Test (SPIUT) [5] for the Indonesian context using Rasch analysis. The SPIUT, originally developed and validated in Western countries, is a concise and effective tool for measuring PIU. The Short Problematic Internet Use Test (SPIUT) is a measurement tool for problematic internet use consisting of 6 items. It was developed based on a review of existing literature and tested using the Compulsive Internet Use Scale (CIUS) as a concurrent measure. Previously, SPIUT has been used with adolescent groups in Italy and Canada [13,14]. Due to its briefness, this tool has the potential to serve as a screening instrument for problematic internet use among adolescents, who currently represent the largest population of internet users.

By utilizing Rasch analysis, a statistical approach based on Item Response Theory (IRT), this current study ensures that the adapted version of SPIUT maintains its psychometric properties, providing a reliable and culturally relevant tool for researchers and practitioners in Indonesia. Rasch analysis not only provides information on the reliability of items, but also the reliability of person [15]. The validation of the Indonesian version of SPIUT will facilitate a better understanding of PIU in Indonesian adolescents, enabling more effective interventions and policies to mitigate its adverse effects. This study represents a significant step towards addressing the mental health challenges posed by the increasing digitalization of society.

2 Methods

This study utilized a quantitative research design to adapt and validate SPIUT. Ethical approval for the study was granted by the Research Ethics Committee at the Faculty of Psychology, Universitas Diponegoro (Approval No. 441/UN7.F11/PP/V/2024). Permission was also obtained from the original developers of SPIUT. Data were gathered from various faculties of undergraduate students at Universitas Diponegoro, to ensure a representation from various backgrounds. The data collection occured over three months, from May to July 2024, using an online survey for survey flexibility.

A total of 84 participants were enrolled in the study, comprising adolescents aged 18 to 21 years. Inclusion criteria required participants to be currently enrolled in undergraduate programme and regular internet users. Participants were recruited through a convenience sampling technique to

ensure representation from different faculty and socioeconomic backgrounds. Recruitment was facilitated through online platforms, ensuring voluntary participation and informed consent.

The SPIUT consisted of 6 items that were used to measure problematic internet use among adolescents. This scale was adapted from the original version of SPIUT [5], initially used with adolescent participants. To create the Indonesian version, the items were first adapted and validated using the back-translation method [16]. The process involved the initial translation of the original version into Indonesian by the two-first translator, followed by the translation of the Indonesian version back into English by two-second translator. In the final stage, the back-translated version was reviewed by the authors and other independent psychology academicians to ensure translation accuracy. Each item is evaluated using a five-point Likert rating scale, ranging from "never" to "very often".

The research procedure involved conducting an online survey to collect data. The survey link was distributed through student WhatsApp groups to ensure wide reach and convenience. Upon accessing the link, participants were first directed to a page containing the informed consent form, which provided detailed information about the study's purpose, procedures, potential risks, and benefits. Participants were required to read the informed consent and indicate their voluntary agreement to participate by selecting the "I agree" option before proceeding to the survey. This process ensured that participants were fully informed and participated willingly. The survey itself consisted of questions designed to assess problematic internet use, and participants could complete it at their own pace.

The Rasch model analysis was conducted using Winsteps 3.73 software [17] for processing polytomous data. Each question was scored on a scale of 4, 3, 2, 1, or 0, with 4 points representing highly appropriate responses and 0 points representing highly inappropriate ones. The raw data were saved in Microsoft Excel format with the PRN extension. The results of the analysis confirmed the unidimensionality of the items based on standardized residual variance.

The output showed a minimum variance value of 20%, meeting the unidimensionality standard. Subsequently, rating scale analysis was used to assess the validity of the answer choices by evaluating whether the selected answers were effective and did not lead to confusion among respondents. For this assessment, the observed average index values and the Andrich threshold were used as references. An answer option was considered optimal if it showed improvement or had the highest score among all the choices provided.

In order to assess the quality of the items, item-fit statistics were used. When the data aligns with the Rasch model, the mean square should be 1.0 and the standardized value 0.0. Boone et al. [18] provided guidance on the criteria for evaluating question suitability: Point Measure Correlation (x): $0.4 < x < 0.85$; Outfit Mean Square (y): $0.5 < y < 1.5$; Outfit Z standard (z): 2.0. Afterwards, the analysis involved assessing the difficulty level of the items based on respondents' likelihood to agree with them. For each item, if the average logit of the person scores exceeded 0.00, it suggested a higher degree of approval from the respondent towards the item.

3 Results

The study participants were primarily from the Faculty of Psychology, with a total of 63 students. Additionally, the Faculty of Economics and Business had 5 participants, while the Faculty of Law contributed 3 participants. The Faculty of Humanities also had 3 participants. There was 1 participant each from the Faculty of Social and Political Sciences, the Faculty of Animal and Agriculture Sciences, and the Faculty of Engineering. Lastly, the Vocational School had 7 participants. This diverse representation from various faculties provided a broad perspective for the study.

The results in Table 1 demonstrate a logit average of -0.09, indicating an average value below the logit threshold of 0.0. This suggests a tendency among respondents to disagree with the statements across various items. The person reliability was 0.63 and the item reliability was 0.95. Despite the weak consistency of respondents' answers, the instrument items show excellent quality [19,15]. The Cronbach's alpha value for reliability measurement is 0.64, reflecting fairly good internal consistency. The high separation value indicates the respondents' ability to provide appropriate responses. The mean-square value between person and item is 0.99, supported by a significant chi-square value, confirming that the data fits the model well [18].

Table 1. Summary of statistics

	Person	Item
N	84	6
Measures (logit)		
Mean	-0.09	0.00
Standard deviation (SD)	0.92	0.62
Standard error (SE)	0.10	0.28
Outfit mean square		
Mean	0.99	0.99
SD	0.73	0.20
Separation	1.30	4.60
Reliability	0.63	0.95
Cronbach's alpha	0.64	
Chi-square	1228.07**	
Unidimensionality (raw variance)	46.2%	
Unexplained variance	5.7%	

*Notes: **p<0.01*

In the process of dimensionality analysis, the goal was to assess the unidimensionality of all scales. The results revealed that the raw variance data accounted for 46.2%, slightly exceeding the expected value of 45.9%. Nonetheless, the criterion of 20% for unidimensionality was met. Furthermore, the unexplained variance was below 15%, indicating a satisfactory level of item independence as an instrument [19].

Rating scales are utilized to assess whether the provided options are clear for participants. According to Figure 1, the average ratings from the respondents regarding the appropriateness of the options were as follows: -1.11 for option 0 (never), -0.76 for option 1 (seldom), -0.09 for option 2 (sometimes), 0.53 for option 3 (often), and 1.48 for option 4 (very often). Additionally,

the Andrich threshold value changed from NONE to 1.87 sequentially, signifying a positive trend in the respondents' perception of the validity of the options given.
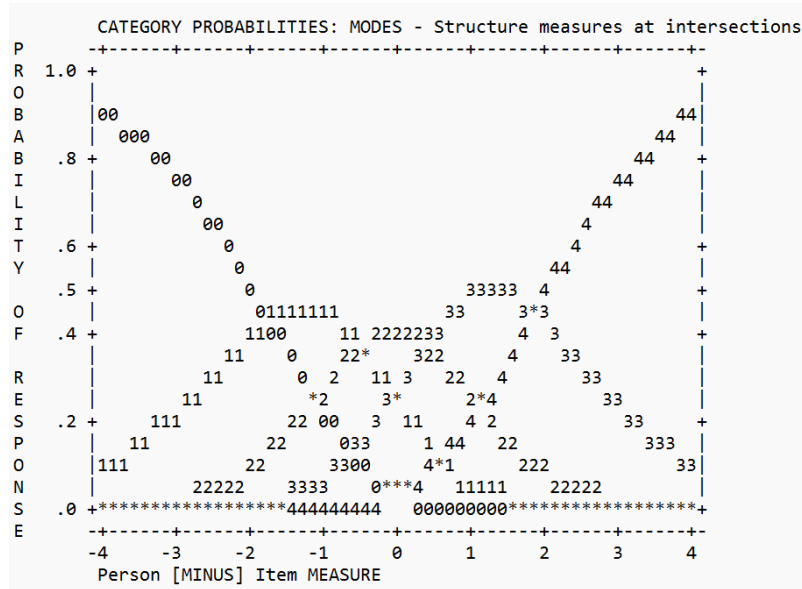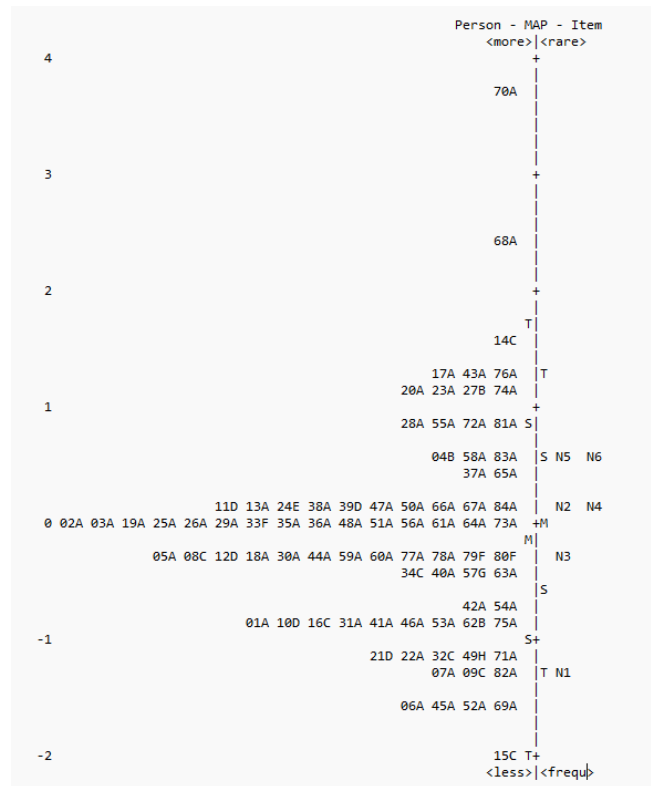

Fig. 1. Rating scale analysis

In the item analysis (Table 2), it is evident that the items generally performed well with outfit MNSQ scores ranging from 0.5 to 1.5, and point measure correlation scores ranging from 0.4 to 0.85 [18]. Based on item logit scores, item 6 received the highest level of disagreement from respondents in the SPIUT, achieving a score of 0.62. Conversely, item-1 was the most unanimously agreed upon item, with a logit score of -1.23.

Table 2. Item properties for SPIUT Indonesian Version

Item	Logit	SE	Outfit mean square (MNSQ)	Point measure correlation (Pt Mean Corr)
Item-1	-1.23	0.14	0.60	0.61
Item-2	0.19	0.13	1.02	0.54
Item-3	-0.26	0.13	1.01	0.60
Item-4	0.15	0.13	1.29	0.70
Item-5	0.53	0.13	0.95	0.50
Item-6	0.62	0.13	1.02	0.61

The Wright map displays the person-item map, with the left column representing the persons and the right column representing the items. The 6 items varied in difficulty, with item-5 and item-6 being the most difficult, and item-1 being the easiest. Respondents disagreed with items that had difficulty levels above the average item logit value (+0.00 logit). Conversely, items with logit values below the average were easily agreed upon by the respondents.

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                                  Person - MAP - Item
                                     <more>|<rare>
      4                                   +
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                                      70A |
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      3                                   +
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                                      68A |
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      2                                   +
                                         T|
                                      14C |
                                          |
                    17A 43A 76A          |T
                    20A 23A 27B 74A      |
      1                                   +
                    28A 55A 72A 81A      S|
                                          |
                    04B 58A 83A          |S N5   N6
                    37A 65A              |
                                          |
         11D 13A 24E 38A 39D 47A 50A 66A 67A 84A  |   N2   N4
0 02A 03A 19A 25A 26A 29A 33F 35A 36A 48A 51A 56A 61A 64A 73A  +M
                                         M|
      05A 08C 12D 18A 30A 44A 59A 60A 77A 78A 79F 80F  |   N3
                    34C 40A 57G 63A      |
                                          |S
                    42A 54A              |
         01A 10D 16C 31A 41A 46A 53A 62B 75A  |
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Fig. 2. Wright map for SPIUT

4 Discussion

The primary objective of this study was to adapt the SPIUT for use with adolescent in Indonesia. Additionally, the study aimed to validate the Indonesian translation of the SPIUT, given the lack of existing measurements for problematic internet use, in order to facilitate research on the topic. Overall, the results indicate that the Indonesian version of the SPIUT demonstrated adequate psychometric properties, particularly in terms of reliability, item properties, category function, and unidimensionality. The instrument exhibited fairly good reliability, with a value of α=0.64. Furthermore, the person-test reliability and item reliability values were 0.63 and 0.95, respectively. These findings suggest that while respondents' answers may lack consistency, the quality of the items was excellent. The rating scale analysis confirmed that the five-point Likert scale was effectively utilized and completely understood by the participants.

The data reveals that " Do you find that you are staying online longer than you intended?" (item-1) received the highest agreement among participants, indicating that college students tend to spend significant time engaging in online activities. However, there was less agreement on "Do you feel nervous when you are offline and is that feeling relieved when you do go back online?" (item-5) and "Have you chosen to spend more time online rather than going out with your friends?" (item-6). This suggests that while participants are active online, they also maintain

involvement in offline social activities, demonstrating adaptability to both online and offline experiences.

The study has significant implications for the enhancement of higher education in Indonesia. Firstly, the validated Indonesian version of the SPIUT can play a vital role in identifying problematic internet use among Indonesian college students. Its implementation can aid universities in evaluating students' internet use and in turn, contribute to the development of effective learning policies, leading to improved academic performance. Previous studies have shown that interventions targeting problematic internet use can help students reduce academic procrastination and enhance their overall satisfaction with academic life [20]. Additionally, students exhibiting higher levels of problematic internet use are more likely to experience academic procrastination and lower levels of academic life satisfaction.

Furthermore, given the substantial number of students in higher education, it is essential to adequately equip them to enhance their academic achievement. Therefore, mitigating problematic internet use becomes pivotal in fostering improved performance. The implementation of SPIUT measuring tools is indispensable in attaining this objective.

The current study had several limitations that need to be acknowledged. Firstly, the use of a self reported measurement makes it susceptible to common method bias [21], potentially impacting the accuracy of the findings. Secondly, the study involved a small number of participants, which could have affected the psychometric properties. Lastly, the research sample consisted solely of undergraduate students from a single university; future studies should strive to include students from a more diverse array of academic institutions.

5 Conclusion

The Indonesian SPIUT demonstrates fairly good psychometric properties, supported by a rigorous Rasch model analysis indicating fairly good reliability, validity, rating scales, and unidimensionality. According to research utilizing the Rasch analysis model, the 6-item Indonesian SPIUT is deemed suitable for implementation as a research instrument to assess problematic internet use among college students. Researchers may consider applying a similar approach for diverse educational levels, and this method can also shed light on the problematic internet use among university students about other variables.

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