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Development of the Indonesian Version of the Internet Gaming Disorder Scale (ID-IGDS)

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Abstract
This study aimed to identify the validity and reliability of the Indonesian version of the Internet Gaming Disorder Scale (ID-IGDS) in measuring Internet gaming disorder. Data were collected from individuals who actively engaged in internet gaming, amounting to a total of 489 teenagers. Rasch analysis was used to examine the unidimensional structure of the scale and its psychometric properties. The results showed that the ID-IGDS has strong validity with an explained variance of 47.8% and good reliability with an item reliability score of 0.99. In addition, there was no significant difference in the results between the sexes in the use of this scale, indicating that the ID-IGDS was used universally without considering the gender factor. This lack of difference can be attributed to the scale's design, which effectively captures the core behaviors and symptoms of internet gaming disorder that are common to both males and females. Additionally, the items on the scale have been adjusted to be gender-neutral, ensuring that they do not favor one gender over the other.

INTRODUCTION

For 18 years, different studies were diligently exploring internet gaming disorder – IGD (Darvesh et al., 2020; Marshall et al., 2022). Even though the majority of individuals participate in this activity for recreational reasons, clinicians and empirical analyses identified a specific group of children and adolescents showing pathological symptoms similar to those observed in other addictive disorders (Gentile, 2009; Ifdil et al., 2021; Kuss & Griffiths, 2012). IGD is consistently associated with a variety of factors, including sociodemographic and psychological characteristics, according to accumulating evidence (Liao et al., 2022; Siste et al., 2021; Throuvala et al., 2019). Personality traits, which are delineated as enduring patterns that vary among individuals and exert an impact on behaviors, could potentially be among the most influential in the development of IGD (McCrae & Costa, 1997). The most widely acknowledged framework of personality traits, the five-factor model, comprises the following dimensions: conscientiousness, extraversion, neuroticism, agreeableness, and openness to experience (McCrae & John, 1992). It has been discovered that these five personality traits are linked to a variety of addictive behaviors, such as drinking, smoking, and gambling (Ibanez et al., 2015). Additionally, higher levels of neuroticism and decreased conscientiousness have been consistently found to be the most pertinent traits in relation to IGD (Şalvarlı & Griffiths, 2019). The occurrence of the IGD among adults varies significantly, with prevalence rates ranging

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from 1% to 5% according to (Feng et al., 2017; Griffiths et al., 2016; Mihara & Higuchi, 2017). Despite the minor gender disparities found in online gaming, females are relatively underrepresented in peer-reviewed studies (Lopez-Fernandez et al., 2018). Recent statistics from the Entertainment Software Association (ESA, 2018) showed that up to 45% of online gamers were female, marking a 12% increase since 2008. Additionally, Ciarrochi et al. (2016) and Su et al. (2019) suggested that females were more likely than males to report poorer mental health and higher psychological distress (Syahputra et al., 2023). This condition is also supported by Ifdil et al. (2018) that there are significant differences between male and female internet addiction. These findings indicate potential gender differences in the preoccupation with gaming, associated activities, and constant thoughts about gaming, as mentioned by the American Psychiatric Association (APA, 2013).

In the DSM-5-section 3 (Fisher & Roget, 2009), a survey conducted in seven European countries with a representative sample of 12,938 adolescents aged between 14 and 17 years old found that 1.6% met the full criteria for IGD, and 5.1% were at risk for the IGD by fulfilling up to four criteria (Muller et al., 2015). Meanwhile, the French Pelleas study reported a higher prevalence of 12% (Obradovic et al., 2014). These prevalence rates of the IGD and at-risk adolescents highlight the need for the development of prevention and intervention programs, as well as the importance of characterizing adolescents with risky usage patterns (Muller et al., 2015). According to Muller et al. (2015), it is crucial to investigate factors such as personality traits and social factors that contribute to the exacerbation of gaming habits in adolescents, as well as factors indicative of remission.

Before planning an intervention to create a prevention program for the dangers of IGD, it is necessary to have a tool to measure adolescents with IGD. The absence of a measuring tool forms the foundation for the research gap addressed. The IGD instruments have been validated and reliably used in various countries to measure online gaming addiction. In the Netherlands, Lemmens et al. (2011) measured IGD in four schools in urban and suburban areas, while in Greece, Durkee et al. (2012) studied 20 schools in Athens based on location and population density. In Hungary, a study with 2,804 participants used international homogeneous stratification. In Australia, King et al. (2013) researched 1,287 students in Adelaide, and in Slovenia, (Pontes et al., 2016) involved 1,071 youths from 12 regions. Mannikko et al. (2015) studied IGD in Finland, while Rehbein et al. (2015) conducted their research in Germany. Ustinaviciene et al. (2016) studied in Lithuania, and Monacis et al. (2016) in Italy, with all these studies using valid and reliable measurement tools adapted to the social and cultural contexts of each country to ensure accurate results.

There are three main reasons to increase research on IGD. First, Indonesia has the fourth largest population in the world, reaching 275 million people. Second, it has become customary for teenagers to engage in internet gaming activities not only during their leisure time but also when they gather with friends at cafes or school. Playing online games has become a common practice among teenagers regardless of their location or the occasion (Zama et al., 2022). The act of accessing internet games is also observed in the presence of family members (Wen et al., 2011). The third reason is based on a report from We Are Social, where Indonesia is ranked third as the country with the highest number of video game players on a global scale. The report showed that 94.5% of internet users aged 16-64 years played video games in January 2022 (Azkiya Dihni, 2022). The condition was supported by several studies which explained high internet addiction (Ardi et al., 2018; Fitria et al., 2018).

We selected the Internet Gaming Disorder Scale (IGDS) over other instruments for a variety of reasons. The IGDS is the most extensively validated instrument across a variety of populations and contexts, thereby guaranteeing its comparability and reliability in the measurement of IGD. Its adaptability to various social and cultural contexts has been demonstrated by its successful implementation in a variety of countries, such as the

Netherlands, Greece, Hungary, Australia, Slovenia, Finland, Germany, Lithuania, and Italy. This comprehensive validation establishes a sound foundation for the IGDS's precision, rendering it an optimal instrument for evaluating IGD in a variety of populations, including Indonesia. The IGDS is more exhaustive in capturing the multifaceted nature of internet gaming disorder than other scales, and it closely aligns with the criteria outlined in the DSM-5. The IGDS provides a more comprehensive comprehension of the disorder by offering a holistic assessment that encompasses a broader range of behavioral and psychological indicators, in contrast to other scales that may concentrate on specific aspects or symptoms of IGD.

This study aims to validate the Indonesian version of Internet Gaming Disorder Scale (ID-IGDS) translated from its original form (Griffiths, 2005; Griffiths & Davies, 2005). Furthermore, it contributes to the literature on preferences for the IGD from various individuals and groups. This study is expected to enrich the understanding of the IGD in the context of Indonesian culture and population.

METHODS

Development of the Scale

Several steps were taken to develop the Internet Gaming Disorder Scale (IGDS) (Griffiths, 2005; Griffiths & Davies, 2005; Lemmens et al., 2015). The original IGDS scale consisted of 27 items designed to measure nine main aspects of IGD, the IGDS has demonstrated excellent psychometric properties, with a Cronbach's alpha of 0.94. First, an extensive literature review was conducted to assess all common scales of the disorder. A total of 40 items were identified to assess IGD, preoccupation with playing internet games, the tendency to think about the concept, loss of concentration, unable to control the duration of playing, comfort playing online games, psychological symptoms, and tendency to return to playing games. Relevant and probable items were also collected, and after removing those with similar content or expression, 25 were retained for further evaluation. Second, expert validation, consisting of psychologists, therapists, health psychologists, psychiatrists, and general practitioners evaluated 25 items, and 5 were removed based on advice. Third, the 20 revised items from the previous expert comprised health education specialists, counseling experts, social psychologists, and education) for review. A total of 8 items were omitted based on comments from the second expert validation. Finally, the 12-item scale was piloted on 489 teenagers, consisting of 181/37% male and 308/64% female to obtain an initial assessment of the scale. A five-point Likert scale was also used to test whether individuals understood the item descriptions. Individual telephone-based cognitive interviews were conducted with the same pilot participants to explore their thoughts about each item of the scale and their responses. There were no further changes, as reported by the pilot participants.

Ethics Approval

Ethical approval Number: 289/EC/IKI/V/2023 was obtained from the official counseling professional organization, the Indonesian Counselors Association, Jakarta, Indonesia. Participants agreed to participate in the research and the publication of results was subject to ethical approval.

Design, Procedure, and Participants

A cross-sectional design was adopted in evaluating the internal construct validity of the ID-IGDS. In order to choose the research sample of teenagers with Internet Gaming Disorder, a number of criteria were utilized to guarantee both representativeness and relevance. The study specifically targeted adolescents between the ages of 12 and 18, as this age group is known to be highly engaged in internet gaming. Participants must demonstrate a consistent pattern of engaging in internet gaming, as evidenced by a minimum of 50 hours of gaming each week.

Respondents were invited to participate in this research through WhatsApp messages. Initial information was provided without any form of coercion. The confidentiality of all personal information shared by the respondents was ensured. In the end, a total of 489 teenagers (comprising 181/37% male and 308/64% female) from various regions were successfully recruited.

Data and Statistical Analysis

Rasch analysis was used in this investigation, and the protocol proposed by Boone (2016) was largely followed. George Rasch, a Danish mathematician, invented Rasch analysis also known as the Rasch Model or Rasch Measurements in 1960 (Bond & Fox, 2015). Rasch's research built on Item Response Theory (IRT), which investigated the relationship between item attributes and respondents' abilities (Waugh, 2012).

The application of Rasch analysis provided several advantages, including consistent linear measures, producing accurate estimates, identifying inappropriate or unusual items or individuals, dealing with missing data, and measurements (Andrich & Marais, 2019; Ifdil et al., 2024; Suranata et al., 2017). In addition, it allowed linear measurement based on the ordinal item responses of the rating scale. The linear measure employed was relatively less known in terms of "Logit," a scoring metric that differed from the traditional notion of scores. "Logit"

Table 1. Measurement Criteria in Rasch

Measurement Properties	Objective	Measurement Criteria
Misfit Item	To evaluate whether an item is functioning consistently with the expected results. Misfit items also indicate the respondents' misconceptions about the items (Sumintono & Widhiarso, 2015).	Outfit MNSQ ranges in 0.5 < MNSQ < 1.5 indicates that the data is under the model (Boone, 2016; Linacre, 2009).
Internal consistency reliability and separation indices	Reliability describes the stability of the measurement results.	Reliabilities of > 0.70 are considered acceptable, showing good internal consistency (Bond & Fox, 2015; Tennant et al., 2011). Person separation indices of > 1.5 logits are considered acceptable (Tennant et al., 2011).
	Separation indices evaluate whether items in the IGD domain can differentiate varying levels of food neophobia.	
Unidimensionality and Local dependency	Unidimensionality represents that only one construct is measured by the items in a questionnaire (internet gaming disorder) (Brentani & Silvia, 2007).	Principal component analysis (PCA), with approximately 40% of the variance explained (Linacre, 2009).
	Local dependency shows local dependency when participant answer patterns depend on other test item responses besides their overall trait level (Tennant et al., 2011).	Inter-item residual correlations of > 0.70, the average residual correlation, indicates significant local dependency (Linacre, 2009).
Item and Person Measure	To assess a person's abilities and item difficulties.	The Wright-map
Item bias via DIF Analysis	To evaluate the degree of group bias in each IGD domain's items (e.g., male versus female).	Item DIF Prob < 0.05, with DIF Contrast of > 0.64 logits.
Precision measurement	To assess compatibility aspects between models and data.	0.32 < Pt. measure Corr. < 0.80 is considered acceptable.

served as an abbreviation for "Log-Odds Unit," which functioned as a measurement unit in Rasch analysis, representing the difference between ability and difficulty level of an item (Ludlow & Haley, 2016; Mari & Wilson, 2014). Rasch analysis offered more in-depth diagnostic information for scaling up (Boone, 2016). This viewpoint provided added value for achieving precise psychometric property estimates concerning the IGD.

The Winsteps computer program (version 5.1.5) and its instruction manual (Linacre, 2021) were used to evaluate the suitability of the observed data with Rasch's expectations (Boone et al., 2014; Sumintono & Widhiarso, 2015). The ID-IGDS was analyzed to identify its overall conformance by Rasch analysis, diagnostic rating scale, targeting, unidimensional assumptions, and local dependencies, as well as item size, fit index, and precision measurements. A summary of the aspects and measurement criteria was presented in Table 1. Meanwhile, to ensure data transparency and uphold the integrity of the method, analysis, and data results were publicly accessible through Open Science Framework at https://osf.io/sx6wh.

Visual displays such as Wright maps were employed to evaluate the distribution of items and individuals on the "Logit Ruler", enabling a broader interpretation of respondent abilities and item difficulty distribution. Subsequently, Differential Item Functioning (DIF) testing was conducted to examine potential variations in item performance across gender-based groups. A comprehensive understanding was achieved by comparing scores between the ID-IGDS and those obtained from different versions of the IGD assessment administered in different global locations.

RESULTS AND DISCUSSION

Results

Overall Fit to the Rasch Measurement Model

The results of the Rasch analysis for the ID-IGDS are shown in Table 2. The person reliability index (0.83) represents great person consistency, while the item reliability index (0.99) shows a very good score. Cronbach's alpha coefficient (0.82) also indicates that the ID-IGDS has 'good' internal consistency, showing a reliable instrument. Table 2 also presents the Person Separation index (2.21) and Item Separation index (13.41), which estimate the capacity of the ID-IGDS to distinguish between people's abilities as a latent attribute and a broad distribution of items. Therefore, the scale covered people's abilities from very low to high because the concept determined easy and difficult items (Tennant et al., 2011).

The results show that the ID-IGDS is a suitable and reliable instrument for measuring IGD. This is because the method achieves a satisfactory distribution across various respondents and component items. Table 2 also shows the average size of items and people, the average for a person is -0.82 logit, meaning that the average ability of people who fill out this scale has a low level of IGD.

Unidimensionality and Local Dependency

Rasch principal component analysis (PCA) proves that the ID-IGDS has a sizable explainable variance of 47.8% (15.1 in Eigenvalue units), above the predetermined minimum

Table 2. Summary statistics of person and item (N = 489, I = 12)

	Reliability	Separation index	Mean measure*)	Cronbach's alpha	Raw variance explained by measure**)
Person	0.83	2.21	-0.82	0.82	47.8%
Item	0.99	13.41	0.00		

*) Measure in Logit.
**) Computed through Principal Component Analysis (PCA).

Table 3. The summary of item measure (I = 12, N = 489)

Item	Total Score	Measure	S.E Model	Infit MNSQ	Infit ZSTD	Outfit MNSQ	Outfit ZSTD	Pt. M. Corr.
Item 9	750	1.08	0.06	0.95	-0.62	0.74	-2.49	0.48
Item 4	769	1.00	0.06	0.83	-2.33	0.66	-3.48	0.49
Item 10	875	0.64	0.06	1.04	0.63	1.03	0.35	0.47
Item 11	895	0.58	0.05	0.97	-0.47	0.95	-0.50	0.50
Item 6	981	0.35	0.05	0.94	-0.99	0.88	-1.49	0.56
Item 12	1147	-0.05	0.05	1.06	0.93	1.07	0.97	0.54
Item 5	1216	-0.20	0.05	1.17	2.72	1.04	0.54	0.62
Item 8	1268	-0.32	0.05	1.13	4.73	1.32	4.33	0.48
Item 2	1322	-0.43	0.05	1.09	1.54	1.13	1.88	0.54
Item 7	1491	-0.79	0.05	0.99	-0.16	0.98	-0.30	0.63
Item 3	1518	-0.84	0.05	0.97	-0.57	1.01	0.15	0.64
Item 1	1594	-1.01	0.05	0.88	-2.08	0.93	-1.19	0.62

Person measure and the Wright-map

criteria (>40%), with an unexplained variance below 15% in the first contrast (6.1%; 1.3 in Eigenvalue units). These findings indicate that the unidimensional assumption for the ID-IGDS has been achieved. Based on the local dependency assumption test, the two highest correlations in the ID-IGDS was identified with a positive direction of 0.41 in items 10 (*Saya murung ketika game yang saya mainkan tidak dapat di akses*) and 11 (*Saya gelisah ketika kuota internet habis, sehingga tidak bisa bermain game online*). The highest correlation also occurred in items 9 (*Saya cemas ketika tidak bisa bermain game*) and 10 (*Saya murung ketika game yang saya mainkan tidak dapat di akses*). These three items conveyed the psychological condition of the respondents in a certain context. Since the standard residual correlation of each pair of items in the ID-IGDS was not > + 0.70 in the positive direction of Linacre (2009), it was concluded that local dependency did not affect the items. Furthermore, the standard residual correlation of each pair of items on the ID-IGDS was not > + 0.70 in a positive direction.

Item Measure, Fit Indices, and Precision Measurement

Table 3 presents statistical measures for the ID-IGDS, which include item size, item suitability level to produce measurement productivity (infit and outfit MNSQ), resulting measurement accuracy rate (S.E. Model), and item discrimination (Point Measure Correlation). Table 3 shows that item 9 *(Saya cemas ketika tidak bisa bermain game)* is the most difficult

Table 4**.** The summary of person measure (I = 12, N = 489)

Entry number	Total Score	Measure	S.E Model	Infit MNSQ	Infit ZSTD	Outfit MNSQ	Outfit ZSTD	Pt. M. Corr.
306	47	0.96	0.32	1.44	1.09	1.84	1.70	-0.28
330	45	0.76	0.31	2.76	3.21	3.01	3.40	-0.33
475	45	0.76	0.31	0.54	-1.30	0.54	-1.22	0.26
334	44	0.67	0.30	1.48	1.22	1.41	1.04	0.25
205	43	0.58	0.30	0.93	-0.06	0.93	-0.06	0.22
094	13	-3.58	0.98	0.77	0.17	0.42	-0.08	0.37
143	13	-3.58	0.98	0.72	0.11	0.34	-0.19	0.44
157	13	-3.58	0.98	0.77	0.17	0.42	-0.08	0.37
158	13	-3.58	0.98	0.72	0.11	0.34	-0.19	0.44
162	13	-3.58	0.98	0.72	0.11	0.34	-0.19	0.44

The DIF analysis

Table 5. Results of DIF Contrast Analysis on the ID-IGDS items (I = 12, N = 489).

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 7	Item 9	Item 10	Item 12
Male	0.25	0.38	0.34	-0.42	0.20	0.36	-0.42	-0.41	-0.49
Female	-0.25	-0.38	-0.34	0.42	-0.20	-0.36	0.42	0.41	0.49

Comparing the ID-IGDS to other IGDs around the world

(1.09 log) for all respondents. Meanwhile, item 1 *(Ketika ada waktu luang saya gunakan untuk bermain game online)* has the lowest difficulty level (-1.01 logit). In this study, all the ID-IGDS items have an MNSQ Outfit between 0.5 < MNSQ < 1.5 where the data fit the model. The "Model S.E" column represents the "Standard Error of Measure" for each item. Meanwhile, the standard error in the proposed instrument is within the range of items included in the acceptable criteria because 0.32 < x < 0.80 (Abdullah & Lim, 2013).

In addition to item measures, a person measure intended to assess the IGD was also presented, as shown in Table 4. Based on the Rasch calculations obtained, Table 4 showed the top and bottom five responses of the 489 respondents. The person size (0.96 logit; S.E = 0.32) was the highest IGD, obtained by male respondent number 306. In contrast, a female respondent number 162, has the lowest IGD (-3.58 logit; S.E = 0.98). Based on the item parameter estimates obtained, the Wright map was used to measure the distribution of respondents' abilities and item difficulty levels on the "Rasch ruler" with similar logit levels. Visualization of the Wright map for the ID-IGDS is presented in Figure 2. Through this mechanism, the pattern of distribution of respondents on the Wright map was easily compared with the distribution of items based on Rasch calculations. This comparison was possible because people and goods had the same unit, and logits were the same unit interval (Boone, 2016). This allowed further between-person (eg person 306 had more IGD than 162) and between-item comparisons (eg, item 1 was easier to agree on than item 9). Items and people were compared through this mechanism (there was a strong chance that person 306 will agree with Item 10, or person 100 will very likely disagree with Item 9).

In the results of the DIF analysis, interesting results were obtained, specifically in the subgroups of respondents. First, there were no items exposed to DIF (prob > 0.05) for the gender subgroups of respondents. Second, in the gender group, 9 out of 12 ID-IGDS items showed DIF

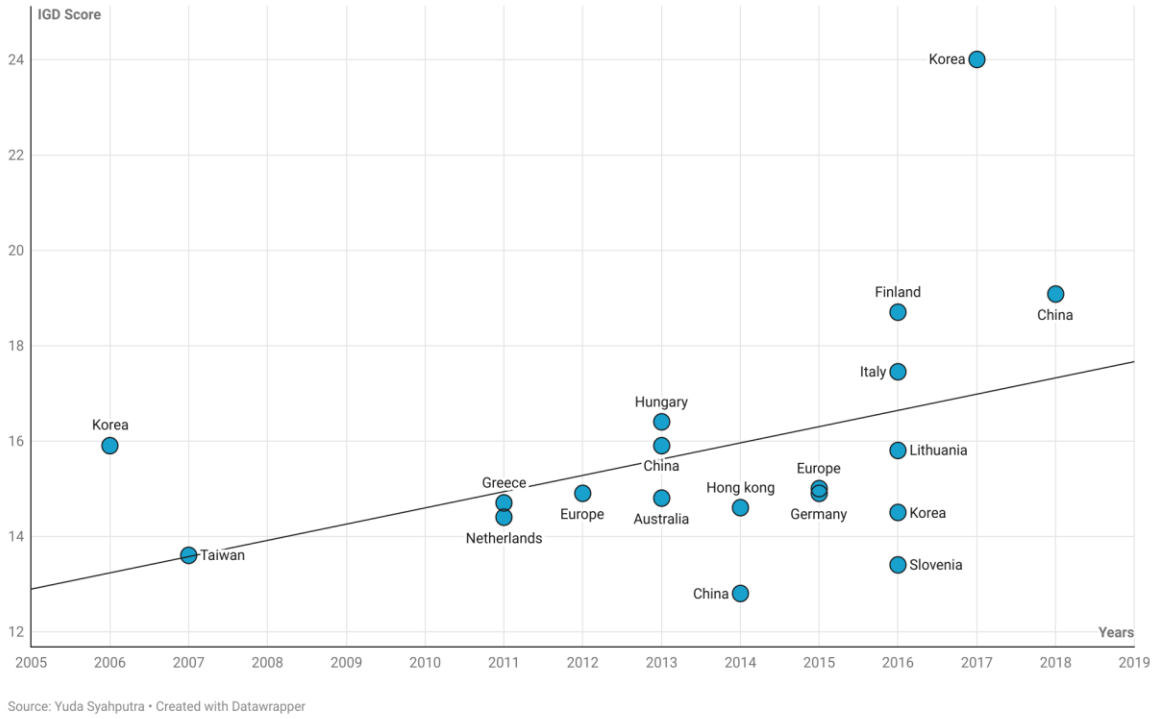

Figure 1. Trend of Internet Gaming Disorder (IGD) in 2006-2018

Note: This figure demonstrates the mean IGD Scores obtained from the study of (Durkee et al., 2012, 2016; M. D. Griffiths & Davies, 2005; King et al., 2013; Ko et al., 2007; Kormas et al., 2011; D. Lee et al., 2017; M. S. Lee et al., 2007; Lemmens et al., 2011; Männikkö et al., 2015; Monacis et al., 2016; Pápay et al., 2013; Pontes et al., 2016; Rehbein et al., 2015; Ustinavičienė et al., 2016; Van Rooij et al., 2011; C. W. Wang et al., 2014; R. Wang et al., 2019; Xu et al., 2012; Yu & Cho, 2016)

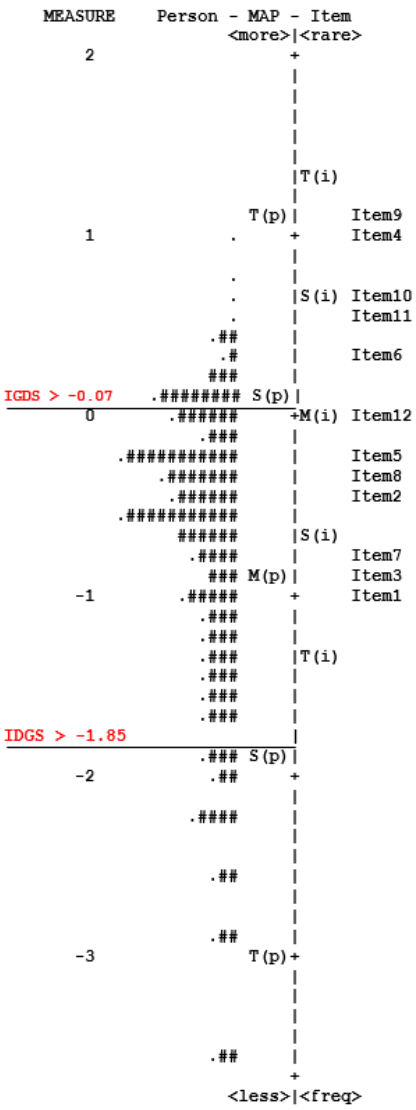

Figure 2. Wright-map Person and Item

(prob <0.05). For example, (1) item 1 (0.01) – *Ketika ada waktu luang saya gunakan untuk bermain game online*, (2) item 2 (0.00) – *Saya nyaman walaupun tidak bermain game*; (3) item 3 (0.00) – *Saya lebih memilih bermain game dari pada belajar*, (4) item 4 (0.00) – *Ketika bangun pagi, hal yang pertama kali terpikirkan oleh saya adalah game online*, (5) item 5 (0.03) – *Ketika melakukan aktivitas belajar, pikiran saya hanya tertuju pada game online*, (6) item 7 (0.00) – *Jika bermain game saya menjadi lupa waktu*, (7) item 9 (0.00) – *Saya cemas ketika tidak bisa bermain game*, (8) item 10 (0.00) – *Saya murung ketika game yang saya mainkan tidak dapat di akses*, and (9) item 12 (0.00) – *Saya gagal berhenti bermain game online ketika melihat teman-teman saya bermain game online*.

It is important to interpret the results of a DIF analysis with caution. An item showing DIF does not directly indicate that it is "unfair" for different subgroups of respondents. According to Boone et al. (2014), DIF on an item does not automatically describe "unfair" for different respondents. From a measurement perspective, items with DIF have different ways of defining their performance between groups of men and women. Therefore, Linacre (2021) proposed evaluating the power of “effect sizes” through the DIF Contrast estimation to determine the differences in subgroup responses to an item (Chang et al., 2019; Zhu &

Aryadoust, 2019). The results of the DIF Contrast analysis on the five items with DIF on the ID-IGDS are presented in Table 5.

Table 5 shows that none of the 9 items has an effect size larger than the DIF Contrast (>0.64 logits). Therefore, keeping all five items in the ID-IGDS will not result in a decrease in measurement accuracy.

Trendlines were constructed to show the comprehensive correlation between the IGD scale and similar scales developed in different parts of the world. As shown in the Figure 1, between 2006 and 2018, Koreans had the highest average IGD score (24.0) of any country (Lee et al., 2017). Korea also conducted the most IGD studies (3 times), with different ED average scores, such as Lee et al. (2007) of 15.9, Yu & Cho (2016) of 14.5, and Lee et al. (2017) of 24.0. In addition, ten studies conducted by (Van Rooij et al., 2011) in the Netherlands reported 14.4, Kormas et al. (2011) in Greece reported 14.7, Durkee et al. (2012) in Europe reported 14.9, Papay et al. (2013) in Hungary reported 16.4, King et al. (2013) in Australia reported 14.8, Pontes et al. (2016) in Slovenia reported 13.4, Mannikko et al. (2015) in Finland reported 18.7, (Rehbein et al., 2015) in Germany reported 14.09, Ustinaviciene et al. (2016) in Lithuania reported 15.8, and Monacis et al. (2016) in Italy reported 17.45, all indicating cases of the IGD in Europe. Similar to the IGD scores in Asia, Ko et al. (2007) reported 13.6, Xu et al. (2012) reported 12.8, and Wang et al. (2014) reported 14.6.

Slovenia by Pontes et al. (2016), the Slovenian version IGDS9-SF demonstrated exceptional internal consistency at various levels, indicating its dependability. This test appears to be a legitimate and trustworthy tool for evaluating Internet Gaming Disorder (IGD) among Slovenian youth. the ID-IGDS data were analyzed apart from the IGD version, from various countries between 2006 to 2018. The result showed that Indonesia had the highest IGD score, as measured by the ID-IGDS, occupying the first position among all countries (27.76) and outpacing global trends.

This study was significant in the current literature by translating, validating, and providing the psychometric property measure of the ID-IGDS. In contrast to other procedures often used in validating similar scales, it took a new perspective by using Rascsh analysis. The results confirmed that the ID-IGDS had sufficient psychometric characteristics to measure internet gaming disorder, specifically for the Indonesian population. the ID-IGDS was unidimensional, free from local dependencies, and provided a productive measure. In addition, there were no inappropriate items compared to the ideal modeling size tested, and the ID-IGDS built also had good reliability for people and items.

Figure 2 presents Wright's person-item Rasch map for the ID-IGDS (n = 489). The image depicts different components of a Wright map. On the right side of the figure, the distribution of the most challenging questions related to the IGD is shown at the top, gradually descending to the least difficult questions at the bottom. On the left side, the distribution of measurable abilities of the respondents is reported, with the least and most capable individuals positioned at the bottom and top. Wright-map directly compares the two in one "bar" Rasch logit. M(p): mean people, S(p): one standard deviation of one's means, T(p): two standard deviations of one's means, M(i): items mean, S(i): one standard deviation of the item mean, and T(i): two standard deviations of the item mean. The symbol "#" represents 5 people, while "." represents 1-4 people. SD Person = 1.03, and SD item = 0.69.

The Item Separation index (13.41) showed the relative repeatability of measurement locations for the 12 IGD items. However, this result was not followed by the results of the Person Separation index which showed 2.21 logs, close to 2.5 logs. According to Linacre (2009), the low separation of people <0.8 with a relevant sample of people implied that the instrument was not sensitive to distinguish between respondents with severe and mild levels of Internet gaming disorder. This situation was acceptable, provided that the separation of people > 1.5 logs (Tennant et al., 2011). Even though the split index did not report data quality

(Linacre, 2009), at this point, the ability range of the respondents was divided into two characteristics, namely severe or light. According to Rasch's calculations, a person or group was considered addicted when they had a high IGD score of > -0.07 Logit. Meanwhile, individuals or groups were considered to have a low IGD score of < -1.85 Logit, as shown in Figure 2.

The DIF results need to be interpreted with foresight. The findings show that 1 out of 2 subgroups leaves a DIF indication. However, nine items with DIF were ultimately retained because their DIF Contrast was < 0.64 logit. The results served as evidence that gender differences in response patterns should not be ignored.

Even though the Indonesian population had a relatively low average score for an Internet gaming disorder, the result obtained was higher than those documented in several countries (Durkee et al., 2016; Rehbein et al., 2015). This finding obtained from Indonesia was notable due to the fact that it placed the average score of the IGD in first place, surpassing the average score for the entire world and rating it as the highest score in the entire world. Each of the indicators of the IGD exhibited a diverse set of outcomes, indicating particular implications such as increased social isolation, poorer academic performance, and increased aggression that are associated to gaming practices. These varied consequences show that the IGD phenomena in Indonesia manifests distinctively across multiple dimensions of individuals' lives, leading to more nuanced findings rather than a singularly high average score. This is because the IGD phenomenon in Indonesia manifests in a way that is entirely unique. Furthermore, Indonesia had to show a genuine and concurrent effort to reduce internet game distraction to align with the recent decline in the global IGD average score, as shown in Figure 1. These findings reported the need to support the use of the ID-IGDS in clinical practice. It was important to provide training to mental health professionals and users of the scale to ensure proper understanding in the use and interpretation of the scale's results. The collaboration assisted in improving and developing the ID-IGDS to suit Indonesian needs and context. The significance of this topic lay in its relevance to the fourth most populous country, as the IGD had become a prevalent phenomenon among individuals. This disorder often led to the manifestation of gaming patterns in real life, extending beyond the virtual realm (Ortiz de Gortari & Griffiths, 2014), such as playing violent video games (Ortiz de Gortari & Griffiths, 2014).

This study has several limitations that must be acknowledged. The primary constraint is the dependence on self-reported data, which may be susceptible to biases such as inaccurate recall or social desirability. In addition, the generalizability of the findings to a broader population was restricted by the relatively small sample size and the specific demographic. The cross-sectional design of the study also obstructs the establishment of causality between online gaming addiction and its associated factors. Moreover, the study failed to consider potential confounding variables, such as pre-existing mental health conditions or socioeconomic status, which could have impacted the results.

Based on these findings, the ID-IGDS was widely used in research and measurements concerning IGD. This scale served as a reliable and valid tool for identifying individuals who might have experienced internet gaming disorder and measuring its severity. The utilization aided in conducting epidemiological research, evaluating interventions, and developing and implementing policies related to internet gaming. Furthermore, additional studies were conducted to validate the ID-IGDS and assess its applicability in different cultural contexts within Indonesia. This scale was used in a broader population, including adolescents, young adults, and older age groups, to comprehend the varying degrees of the IGD that differed across these groups.

Future Research Recomendation

Future researchers are advised to undertake more thorough investigations using mixed methodologies that integrate qualitative and quantitative approaches in order to obtain a comprehensive comprehension of online gaming addiction among adolescents. Furthermore, it is strongly advised to conduct research on technology-based therapies, such as applications or online platforms specifically developed to mitigate the problem of online gaming addiction. Examining the impact of social support from family, peers, and educational institutions on adolescents' ability to regulate their online gaming time is crucial. There is a need to do additional study to broaden our understanding of the effects of online gaming addiction on the academic, social, and emotional aspects of teenagers.

CONCLUSIONS

In conclusion, the ID-IGDS was produced by this study. The results showed that the ID-IGDS was a twelve-item unidimensional scale with strong psychometric properties. Therefore, this scale was well utilized in identifying and measuring the level of the IGD in the population studied. It did not show differences in results between the sexes and was used universally regardless of gender. The implications showed that the ID-IGDS was a reliable and valid instrument in the research and measurement of the IGD in Indonesia.

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AUTHOR CONTRIBUTION STATEMENT

II, AYAB conceived the research idea, played a central role in designing the review protocol, and supervised the entire project, providing guidance at every stage. YS, RPF, AK, NZ conducted the primary search and data extraction and analyzed the data, the interpretation of the results, and the discussion section. YS, AK analyzed and synthesized the collected data. YS, RPF, AK, NZ contributed to the interpretation of the results and the discussion section. YS, RPF, AK, NZ assisted in the manuscript's writing and editing processes and supervised. II, AYAB made critical revisions, and approved the final manuscript, II, YS, RPF, AK, AYAB, NZ contributed to the interpretation of the results and approved the final manuscript.

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