Psychometric Properties of the Malay-version of Social Media Addiction Test (SMAT17): The International Test Commission Approach

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The over-reliance on social media platforms is a growing concern, as more people find it difficult to disconnect from their online lives and develop an addiction. To effectively combat this issue, it is imperative to employ validated assessment tools that accurately measure problematic usage behaviors. This study aimed to adapt and validate the Social Media Addiction Test (SMAT17) for use in a Malaysian context. The adaptation process adheres to the International Test Commission Guidelines (ITC) for translating and adapting a test. A sequential translation design encompasses forward-backward technique, committee approach, and panel review were employed to translate the test. A total of 12 bilingual translators and a psychometric expert involved in the translation process. The Malay-version of SMAT17 demonstrated construct, language, and cultural equivalence of the original version and employed for a small-scaled validation study. A total of *N*=437 respondents were recruited using a convenience sampling technique. Psychometric properties of the adapted SMAT17 were examined using the Partial Least Squares Structural Equation Modelling (PLS-SEM) approach. Results indicate that the Malay-version SMAT17 demonstrated a similar factor structure as conceptualized in the original instrument. All PLS-SEM measurement model criteria were fulfilled, including significant outer loading, high internal consistency reliabilities, AVE, and HTMT correlations. SMAT17 also demonstrated convergent validity with the Smartphone Addiction Scale-Short Version (SAS-SV), and discriminant validity with the Satisfaction with Life Scale (SWLS). The successful adaptation of the SMAT17 provides a valuable tool for researchers and practitioners to investigate and address social media addiction in Malaysia.

Keywords: Social Media Addiction Test (SMART17), Psychometric Properties, Validity, Reliability, ITC Guidelines, Malay-version

Social media addiction has become a growing concern in the modern digital age, as individuals increasingly find themselves spending excessive amounts of time engaging with various online platforms and applications. Problematic social media use has been linked to a number of adverse outcomes, such as diminished productivity due to distractions from primary tasks (Kırcaburun & Griffiths, 2019), increased symptoms of depression and anxiety (Plackett, Blyth, & Schartu, 2023), and the weakening of in-person social connections (Diomidous, Chardalias, Magita,

Koutonias, Panagiotopoulou, & Mantas, 2016). While some research indicates that social media can provide benefits in terms of strengthened social bonds and access to support networks (e.g., Moorhead, Hazlett, Harrison, Carroll, Irwin, & Hoving, 2013), the overriding evidence suggests that excessive and compulsive social media use can have a detrimental impact on mental well-being, particularly among adolescents and young adults (Khalaf, Alubied, Khalaf, & Rifaey, 2023; Pang, 2022).

Social media addiction is generally defined as a behavioral addiction characterized by a preoccupation with social media, a perceived inability to control one's use, and the neglect of other life areas as a consequence of excessive social media engagement (Plackett, Blyth, & Schartau, 2023). One critical step in addressing the issue of social media addiction is the development and utilization of validated assessment tools to accurately identify problematic usage patterns.

The widespread adoption of social media and its increasing problematic usage has spurred significant interest from both academics and researchers, leading to the development of numerous social media addiction measures, including the Social Media Addiction Scale (SMAS, Tutgun-Ünal & Deniz, 2015), Bergen Social Media Addiction Scale (BSMAS, Andreassen, Billieux, Griffiths, Kuss, Demetrovics, Mazzoni, et al., 2016), and the Social-Media Addiction Screening Scale (S-MASS, Chanpen, Pornnoppadol, Vasupanrajit, & Ayudhya, 2023). While these measures offer valuable insights, the present study opted to adapt the Social Media Addiction Test (SMAT17) developed by Esgi (2016) due to its robust psychometric properties, comprehensive administration guidelines, and clear scoring and interpretation procedures. The SMAT17 reported rigorous test construction and validation processes with substantial reliability and validity evidence (Esgi, 2016). Moreover, its accessibility, being freely available for use, and its widespread adoption as one of the most commonly used measures in this field (Altuwairiqi, Jiang, & Ali, 2019) make it a suitable choice for current research. Additionally, the SMAT17's suitability for use in non-clinical settings further enhances its appeal for this study, as it allows for the assessment of social media addiction in a broader population beyond clinical samples.

The primary objective of the present study was to adapt the SMAT17 for use in a Malaysian context and establish its psychometric properties. This adaptation aims to facilitate a deeper understanding of social media addiction within this cultural setting. Adapting psychological instruments for use across diverse cultural and linguistic contexts is crucial to ensure the validity and reliability of assessments.

The process of test adaptation involves rigorous translation and validation of the source instrument for use in a new cultural context. This approach is often preferred over developing entirely new measures due to its cost-effectiveness and the ability to produce equivalent measures for cross-cultural comparisons (Shala, Morina, Burchert, Cerga-Pashoja, Knaevelsrud, Maercker, et al., 2020). However, test adaptation is not merely a matter of translation. It requires careful consideration of cultural biases and the establishment of conceptual and measurement equivalence. Researchers should adhere to established guidelines, such as those provided by the International Test Commission (ITC). These guidelines outline necessary a priori steps and procedures to ensure robust adaptations that maintain the psychometric properties of the original instrument (Gjersing, Caplehorn, & Clausen, 2010). Proper test adaptation is essential for producing valid and reliable measures that can be meaningfully applied across diverse cultural and linguistic contexts.

Method

The present study adopts the first two stages outlined in the ITC's Guidelines for Translating and Adapting Tests (ITC, 2017). This guideline provides a framework for ensuring the quality and equivalence of tests across different languages and cultures. The guideline was organized into six sections, with the first two being particularly relevant to the initial stages of this study. The "Pre-Condition" section, encompassing three guidelines, emphasizes crucial preliminary decisions that precede the translation and adaptation process. Following this, the "Test Development" section, containing five guidelines, focuses on the adaptation process itself. By adhering to these guidelines, the present study aims to ensure a rigorous and systematic approach to test adaptation.

Measures

Social Media Addiction Test (SMAT17)

Esgi (2016) developed The SMAT17 as a psychometric instrument designed to assess social media addiction. The present study applied ITC (2017) guidelines to adapt this test for Malaysian context. The test comprises of 17 items that are grouped into four distinct factors: Time, Social Sharing, Occupation, and Health. The SMAT17 utilizes a four-level frequency scale where respondents indicate the frequency of their social media behaviors using options ranging from "never" to "always". SMAT 17 demonstrated high internal consistency reliability with a Cronbach's alpha of α = .94. Content validation with 10 subject matter experts demonstrated 90% endorsement for all 17 items. Construct validity has been established through both exploratory and confirmatory factor analyses demonstrating appropriate support for the conceptualized factor structure.

Smartphone Addiction Scale Short-Version (SAS-SV)

The SAS-SV developed by Kwon, Kim, Cho, and Yang (2013) was employed to assess the convergent validity of the SMAT17. This 10-item scale has been widely used to evaluate the prevalence and correlates of smartphone addiction across diverse populations (Dharmadhikari, Harshe, & Bhide, 2019). The SAS-SV utilized a six-point Likert scale (1:"strongly disagree" to 6:"strongly agree") and has demonstrated robust psychometric properties, including strong internal consistency (α= 0.91; Lin, Chiang, Lin, Chang, Ko, Lee, et al., 2016) and convergent validity with measures of sleep quality, stress levels, and social media addiction (Aljomaa, Oudah, Albursan, Lynn, & Abduljabbar, 2016; Dharmadhikari et al., 2019). The scale assesses various dimensions of problematic smartphone use, such as excessive usage, psychological-social impacts, health concerns, preoccupation, and technological dependence.

Satisfaction with Life Scale (SWLS)

The Satisfaction with Life Scale (SWLS) developed by Diener, Emmons, Larsen, and Griffin (1985) was employed to assess the discriminant validity of SMAT17. The SWLS utilized a seven-point Likert scale (range from 1:"strongly disagree" to 7:"strongly agree") and has been extensively validated across various populations, demonstrating robust psychometric properties. Studies conducted in Portugal (Laranjeira, 2009), Spain (Martínez, Martínez, Garcia, Cortes, Ferrer, & Herrero, 2004), Hong Kong (Sachs, 2003), and Mexico (López-Ortega, Torres-Castro, & Rossas-Carrasco, 2016) consistently reported high internal consistency, with Cronbach's alpha values ranging from 0.74 to 0.89. Factor analysis have reinforced the scale's unidimensional

structure, explaining 54-58.6% of the variance (López-Ortega et al., 2016; Martínez et al., 2004). Additionally, the SWLS has demonstrated high test-retest reliability (r = 0.86) in a Portuguese sample (Laranjeira, 2009). Moreover, the scale has shown good discriminant validity in distinguishing between groups with differing levels of subjective well-being (Laranjeira, 2009; Martínez et al., 2004) and convergent validity through significant correlations with mental health domains, depression, perceived health, and social support (Martínez et al., 2004; López-Ortega et al., 2016).

Procedure

The present study adheres to the pre-conditioned (PC-1(1), PC-2(2), PC-3(3)) and test development (TD-1(4), TD-2(5), TD-3(6), TD-4(7), TD-5(8)) procedures outlined in the ITC's (2017) guidelines:

Pre-conditioned Guidelines

PC-1 (1): Formal permission was obtained from Dr. Necmi Esgi, the developer and copyright holder of SMAT17, through an email on March 18, 2024. The request for permission highlighted the purpose of translating and adapting SMAT17 to be used in Malaysian context.

PC-2 (2): To assess the construct overlap of the SMAT17 between its original context and the target populations, a brief interview was conducted with a subject-matter expert (SME) in psychology. The SME is a PhD holder in psychology and an expert in psychometric. He was, at the time of interview, serving as a senior lecturer at a Malaysian public university. The interview was conducted for the SME to evaluate the familiarity, meaning, and abstraction of the target construct, which is social media addiction in Malaysia. Based on the interview, the SME concluded that the social media addiction has about the same familiarity and meaning in Malaysia and have about the same level of abstraction. There was minimal risk of cultural differences affecting the responses of Malaysian participants. This suggests that the SMAT17's content and construct are sufficiently aligned with the intended use in the target population.

PC-3 (3): The same interview with the SME from PC-2(2) asked about the influence of cultural and linguistic differences on the intended uses of SMAT17 in the population of interest. The SME indicated that there were no differences between the original language and target language in the use of metaphors, idioms, or colloquialisms. Additionally, the test does not contain any measurement or currency units that require conversion and are unfamiliar in the Malaysian context. Furthermore, the test layout, item stem, test format, and phrase emphasis (e.g., bold, italics, underline, etc.) are familiar in the Malaysian context. Therefore, SMAT17 does not contain any cultural or linguistic differences that may influence the motivation or response of the Malaysian population.

Test Development Guidelines

TD-1 (4): A total of 12 bilingual translators were recruited to participate in the translation exercise. Six of these translators were assigned to forward translation, while the remaining six were tasked with backward translation. All the translators fulfilled the selection criteria of (1) native speakers of the target language, Malay, (2) have an in-depth knowledge of the target culture, (3) living in Malaysia for at least five years, (4) familiar with the content of social media addiction, and (5) have knowledge of assessment principles.

TD-2 (5): A sequential translation design was employed, incorporating forward-backward translation, committee approach, and panel review methods. Initially, a group of six translators, instructed to prioritize dynamic equivalence (Hatim &

Munday, 2019) over literal meaning (ITC, 2017), independently translated the SMAT17 from its original language into Malay. Following individual translation, this group convened to discuss and select the most suitable translation for each item. The agreed-upon forward translation was then submitted for backward translation by another group of six translators who had no prior exposure to the original version. These translators also worked independently before collaborating to identify discrepancies and choose the best translation for each item. A comparison of the backward translation with the original revealed minor linguistic differences, but the intended meaning and purpose of the items remained intact. Both the Malay and original versions were included in a panel review form developed by Hambleton and Zenisky (2010) and submitted to the SME from PC-2 and PC-3. The SME indicated that the translation effectively conveyed the original meaning and recommended it for field testing.

TD-3 (6) and TD-4 (7): These guidelines were addressed through a panel review form (Hambleton & Zenisky, 2010; ITC, 2017). The form assessed the appropriateness of test instructions, format, and item content for the intended population. Section one of the form evaluated the equivalence of meaning, comparable difficulty, and any necessary adaptations between the original and target languages (items 1-4). Section two focused on item format, length, familiarity, and phrase emphasis (items 5-9). However, item 9 was deemed inapplicable as SMAT17 is not an educational test that requires right-or-wrong answer. The SME endorsed eight of the nine items, indicating no significant issues with the instruction, format or content of SMAT17.

TD-5 (8): A small-scale validity study was conducted using convenience sampling to establish the psychometric quality of the Malay-version SMAT17. *N* = 437 participants were recruited through social media and completed the translated SMAT17, along with the SAS-SV and SWLS, in an online format. Data were converted to SPSS software (version 26) and later analyzed using Smart-PLS (version 3.2.9).

Results

SMAT17 is a higher-order reflective-formative construct that contains four components. Following the procedures outlined by Reza and Amir (2023) and Mohd Dzin and Lay (2021), reflective measurement models were analyzed using the PLS algorithm to assess the relationships between indicators and the four components. Formative measurement models were then employed to examine the relationships between each component and the latent construct. SAS-SV and SWLS were included in the analysis as the measure for construct validity (convergent & discriminant validities).

Reflective Measurement Model

Outer Loadings

The outer loadings in PLS-SEM measure the relationship between indicators and their constructs. They are essential for evaluating the reliability and validity of the measurement model, along with cross-loadings and weights (Afthanorhan, Awang, & Ajmran, 2020; Kock, 2014). High-quality standardized loadings contribute to the reliability and validity of construct representation, which is crucial for ensuring accurate results in structural equation modelling (Afthanorhan et al., 2020). Item-16 of SMAT17 has an outer loading of 0.345, which is below the recommended threshold of 0.40 (Hair, Risher, Sarstedt, & Ringle, 2019). Therefore, this item was omitted from the analysis. Table 1 summarizes the factor loadings for the four conceptualized factors, which range from 0.430 to 0.819.

Table 1
Outer Loadings of SMAT17

Item	Outer Loadings			
	1	2	3	4
1.Adakah anda lebih gemar meluangkan masa dengan melayari media sosial atau bersama rakan-rakan	0.546			
2. Adakah anda akan mengabaikan kerja-kerja anda untuk meluangkan masa melayari media sosial?	0.712			
6. Adakah anda menghabiskan kebanyakan masa harian anda dengan media sosial?	0.678			
9. Adakah boleh dikatakan bahawa anda banyak meluangkan masa di media sosial melebihi apa yang sepatutnya?	0.791			
5. Berapa kerap anda berjumpa kawan baru dengan pengguna media sosial yang lain?		0.615		
7. Adakah anda merasakan bahawa diri anda menjadi lebih renggang daripada rakan-rakan anda sejak menggunakan media sosial?		0.671		
12. Adakah anda lebih gemar menghabiskan masa melayari media sosial berbanding menghabiskan masa dengan rakan-rakan anda?		0.697		
13. Adakah anda lebih gemar menghabiskan masa di media sosial berbanding meluangkan masa melakukan hobi anda?		0.668		
14. Adakah anda berjumpa dengan orang yang anda kenali di media sosial atau anda cenderung untuk berjumpa dengan mereka?		0.430		
8. Adakan anda merasakan bahawa penggunaan media sosial memberi impak kepada prestasi kerja anda?			0.489	
10. Adakah anda perlu selalu melayari akaun sosial media anda setiap waktu?			0.819	
15. Adakah anda berasa bahawa ketagihan media sosial adalah keperluan untuk kehidupan sosial?			0.717	
3. Adakah anda mempunyai tindak balas untuk mempertahankan diri apabila aktiviti anda di media sosial dipersoalkan?				0.603
4. Adakah penggunaan media sosial menimbulkan rasa keletihan terhadap fizikal dan emosi anda?				0.520
11. Adakah anda akan merasa marah sekiranya diganggu ketika anda menggunakan sosial				0.753

media?	
16. Adakah anda berasa puas semasa menggunakan media sosial?*	0.345*
17. Adakah anda berasa kekurangan sesuatu apabila tidak menggunakan media sosial?	0.739

Factor 1: Time
Factor 2: Social sharing
Factor 3: Occupations
Factor 4: Health
**Omitted due to loading <0.40*

Internal Consistency Reliability

Internal consistency reliability of all three measures employed in the present study indicates good reliability with the scores for Cronbach alpha, rho_A, and composite reliability were >0.70 range from 0.819 to 0.970. Table 2 summarizes the reliability scores of all variables.

Table 2
Internal Consistency Reliability and AVE

Construct	Cronbach alpha	rho_A	rho_C	AVE
SMAT17	0.819	0.843	0.855	0.535
SAS-SV	0.832	0.852	0.871	0.544
SWLS	0.825	0.970	0.859	0.628

Average Variance Extracted (AVE)

The AVE is a metric to assess convergent validity in the PLS-SEM measurement model. The recommended standard for AVE is >0.50 (Hair et al., 2019). Table 2 indicates that all three constructs demonstrated acceptable AVE after dropping weak indicators from the model (i.e., SMAT17: Item-16, SAS-SV: Item-1,2,9, SWLS: Item-1).

Heterotrait-Monotrait Ratio (HTMT)

The discriminant validity of the constructs was assessed using the HTMT values. All HTMT correlations were below the recommended threshold of <0.85, ranging from 0.207 to 0.771, indicating that all of the constructs are sufficiently distinct.

Table 3
Heterotrait-Monotrait Ratio (HTMT) and Correlations of SMAT17, SAS-SV and SWLS

Measure	SMAT17		SAS-SV	
	HTMT	*r*	*HTMT*	*r*

SMAT17	-	-	-	-
SAS-SV	0.771	0.644*	-	-
SWLS	0.207	-0.078	0.340	0.039

**p<.001*

In conclusion, all indicators of SMAT17, except for item-16, exhibited satisfactory outer loading, internal consistency reliabilities, AVE, and HTMT values. In addition, three items from SAS-SV and one item from SWLS were omitted due to weak loading values. All remaining items within the three constructs were retained and included in the subsequent structural analysis.

Formative Measurement Model

The relationships between the four conceptualized components and the overall construct of SMAT17 as a formative construct were analyzed through the Variance Inflation Factor (VIF) and *t*-statistics after bootstrapping. VIF analysis was conducted to identify potential multicollinearity issues among the components. As shown in Table 4, all VIF values were less than <5, suggesting minimal multicollinearity issues according to Hair et al. (2019). Furthermore, *t*-statistics after bootstrapping were observed to assess the significance and relevance of the outer weights of the four components. The results indicated that all formative indicators were significant supporting the significance and relevance of SMAT17 as a formative construct.

Table 4
Measurement Properties for Formative Construct of SMAT17

Components of SMAT17	Weights	VIF	*t*-value weights	Sig.
Time	0.327	1.946	21.271	.000
Social sharing	0.321	1.816	18.374	.000
Occupations	0.283	2.671	22.964	.000
Health	0.316	1.691	18.235	.000

Convergent and Discriminant Validities with Criterion Measures

In addition to the AVE and HTMT, two criterion measures were included to assess the convergent validity of SMAT17, namely SAS-SV and SWLS. As shown in Table 3, SMAT17 exhibited a significant positive correlation with SAS-SV (r = 0.644, p < .001), providing evidence of convergent validity. In contrast, no significant correlation was found between SMAT17 and SWLS, suggesting evidence of discriminant validity.

Discussion and Conclusion

The present study embarked on a rigorous translation and adaptation process of the SMAT17 to be used in a Malaysian context. Adhering to the International Test Commission's (ITC, 2017) guidelines, the

study adopted a forward-backward translation approach, committee approach, and panel review to ensure the linguistic and conceptual equivalence of the SMAT17 in Malaysia. An interview with a subject matter expert (SME) and the application of Hambleton and Zenisky's (2010) approach to construct and cultural equivalence further strengthened the adaptation process.

The analysis of the panel review form indicated that the translated version of the SMAT17 was sufficiently accurate to warrant a pilot test. Subsequent analysis of the small-scaled validation data using Smart-PLS revealed promising psychometric properties. The SMAT17 demonstrated high internal consistency reliabilities, suggesting that the items are measuring a consistent construct. Additionally, evidence of construct validity was established through the analysis of factor structure, convergent validity with the SAS-SV, and discriminant validity with the SWLS. These findings collectively provide strong support for the reliability and validity of the SMAT17 in the Malaysian context.

The successful adaptation of the SMAT17 to the Malaysian context has significant implications for research and practice. It provides a reliable and valid instrument for measuring social media addiction among Malaysians, enabling researchers to investigate the prevalence, correlates, and consequences of this phenomenon. Furthermore, the SMAT17 can be used to inform the development of interventions and prevention strategies to address social media addiction-related issues in the Malaysian population.

While the present study provides compelling evidence for the psychometric properties of the adapted SMAT17, future research is needed to further validate and refine the instrument. Larger-scale studies with diverse samples and sampling techniques are necessary to further enhance the current findings. Additionally, exploring the cultural influences and specific contexts of social media use in Malaysia may provide valuable insights into the development and interpretation of the SMAT17.

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