The Translation and Validation of The Smartphone Use Questionnaire (SUQ) Into The Malay Language

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ABSTRAK

Daya tumpuan terhadap aktiviti harian boleh terganggu akibat penggunaan telefon pintar. Hal ini membawa implikasi serta padah ke atas kesihatan, keselamatan dan pendidikan seseorang individu. "Smartphone Use Questionnaire" (SUQ) merupakan borang soal selidik yang mempunyai 20 soalan untuk mengenal pasti cara penggunaan telefon pintar dan kesannya ke atas daya tumpuan. Tujuan kajian ini adalah untuk penterjemahan dan melihatkan kebolehpercayaan (validity) pengukuran psikometriks SUQ ke dalam Bahasa Malaysia. Terjemahan dilaksanakan bersama empat individu melalui dua fasa iaitu terjemahan ke hadapan dan ke belakang. Pengesahan kandungan dan muka dilakukan bersama tiga pakar dalam bidang linguistik, psikiatri, dan epidemiologi. Ujian psikometriks dilaksanakan atas sampel 195 individu yang mahir dalam Bahasa Malaysia. Pengesahan konstruk dilaksanakan dengan analisa faktor dan kebolehpercayaan dalaman pula dikira menggunakan Cronbach's Alpha. Julat umur sampel adalah dari umur 13-59 tahun, di mana majoriti daripadanya adalah perempuan dan berbangsa Melayu. Analisa faktor menggunakan analisa komponen utama, mendapati dua komponen menyerupai kajian asal SUQ. Dua komponen tersebut adalah Penggunaan Secara Am dan Penggunaan Tanpa Tumpuan. Namun, kajian ini mendapati soalan 20 tidak menyerupai kajian asal. Ini kerana soalan 20 dikumpulkan dalam komponen Penggunaan Tanpa Tumpuan manakala dalam kajian asal ia dikumpulkan dalam

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Penggunaan Secara Am. Nilai Cronbach's alpha bagi komponen masing-masing adalah 0.884 dan 0.927. Maka, kajian ini menunjukkan bahawa borang soal selidik SUQ terjemahan Bahasa Malaysia adalah sah dan boleh digunakan di Malaysia untuk mengukur daya tumpuan ketika menggunakan telefon pintar.

Kata kunci: borang soal selidik, daya tumpuan, psikometriks, telefon pintar

ABSTRACT

Interruptions caused by frequent smartphone use steals attention away from daily activities, bringing serious implications onto an individual's health, safety and education. Smartphone Use Questionnaire (SUQ) is a 20-item questionnaire developed to assess the pattern of smartphone use and its effect on attention. This study was done to translate and validate the Malay-language version of the SUQ and to measure the psychometric properties of the Malay-version SUQ to justify its use in Malaysia. A forward and back-translation was done by four individuals, who were three physicians and one linguist. Content and face validity was done involving three experts who were a linguist, psychiatrist and epidemiologist. Psychometric testing was conducted on a sample of 195 individuals proficient in the Malay language. A construct validity test was performed using factor analysis and the internal reliability was tested by calculating for the Cronbach's Alpha. The age range of the sample was 13-59 years, most of which were female and of the Malay race. Using principal component analysis with direct oblimin rotation, the factor analysis extracted two components similar to the original study: General Use and Absent-Minded Use. However, question number 20 was grouped into General Use component, whereas in the original study it was under the Absent-Minded Use component. The Cronbach's Alpha for the obtained components was 0.884 and 0.927, respectively. This study found that the Malay-version SUQ was a valid and reliable instrument for use in Malaysia in assessing inattention associated with smartphone use.

Keywords: smartphone, attention, psychometrics, questionnaire

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INTRODUCTION

Smartphones are a technological advancement that has been introduced to humankind since the mid-1990s. The first smartphone developed for public purchase was by the International Business Machines (IBM) Corporations. Smartphones had a slow start initially but began booming in the early 2000s with the introduction of 3G internet which allowed high speed data transfer. A new standard for smartphones was set by Apple's iPhone in 2007. The user-friendly interface and an open developer community

that provides a plethora of applications that can be bought via its Apple Store. Shortly after, Google introduced their own operating system (OS), Android, as a direct competitor to Apple's iOS (Islam & Want 2014).

Smartphones have been integrated into our lives with up to 3.2 billion users as of 2019 (O'Dea 2020). In Malaysia, it is estimated that 76.4% of Malaysians are active smartphone users (MCMC 2018). Malaysia records 88.7% of her people as internet users of whom 98.7% are accessing it via smartphones (MCMC 2020).

Measurements of smartphone use is commonly in the context of addiction such as in the Smartphone Application-Based Addiction Scale (SABAS), Smartphone Addiction Scale (SAS), and the Problematic Smartphone Use (PSU) (Csibi et al. 2018; Kwon et al. 2013; Valderrama 2014). However, the Smartphone Use Questionnaire (SUQ) developed by (Marty-Dugas et al. 2018) measures the frequency of general smartphone use along with absent-minded use. The study attributed that absent-minded smartphone use as a factor in daily inattentiveness. This questionnaire was developed in the English language for use in Canada.

Inattention is a lapse or loss of attention resulting from a distracting stimulus. Smartphones are notoriously known to cause distractions especially with its notifications (Fitz et al. 2019). Texting, going on social media, and gaming are the few actions that can lead to distractions that takes away visual and auditory focus from our surroundings such as walking down the stairs, crossing the street and driving (Abd Rahman et al. 2021; Chen et al. 2018; Hashish et al. 2017).

Malaysia has both high accident rates and fatality rates due to road accidents. The Malaysian Institute Road Safety Research (MIROS) reported that 6,570 people died in road accidents in 2016. It was also estimated that about 80% of the road accidents were caused by human errors which includes inattention (Babulal 2017). Worryingly, a survey done in 2016 and 2020 revealed a high number of road users in the Klang Valley use their handphones whilst driving at 43.4% and 53.1%, respectively (Abu Bakar & Osman 2016; You et al. 2020).

Local studies on smartphone use leans more towards looking into smartphone addiction and correlate them with mental health issues, such as correlating it with sleep quality, and psychosocial health (Ithnain et al. 2018; Samat et al. 2020). The pattern of smartphone usage along with its effect on attention is less commonly studied in Malaysia.

This study aimed to translate and validate the SUQ into the Malay language. As the rate of smartphone use continues to rise, there is a need to study patterns of smartphone use which may help further research in human-technology behaviour.

MATERIALS AND METHODS

Study Design and Participants

This was a cross-sectional validation study of the Smartphone Use Questionnaire General and Absent-

Minded (SUQ-G & SUQ-A). Two phases were done in this study where the first phase was a back-to-back translation, and face and content validity. The second phase was field testing along with the psychometric analysis.

The respondents were recruited voluntarily in this study by accessing a Google Form link to answer the questionnaire. The inclusion criteria were respondents aged 13 years or older, understands the Malay language and has a smartphone device. A 5:1 respondents to item ratio was used as the minimum sample size needed for this study (Kim & Mueller 1978).

Smartphone Use Questionnaire General and Absent-Minded

The SUQ-G and SUQ-A developed by (Marty-Dugas et al. 2018) is a set of questionnaires that measures the behaviour of smartphone use both in general and absent-minded circumstances. It consists of 20 items and is answered on a 7-Likert scale from "Never" to "All the time". Participants answering "All the time" will be scored 7 for that item. The average score will then be calculated with a higher score indicating a more frequent smartphone use in that behaviour. This questionnaire also has good internal consistency with Cronbach's alpha value at 0.78 (SUQ-G) and 0.91 (SUQ-A) (Marty-Dugas et al. 2018).

Translation

The SUQ-G and SUQ-A was translated from English into the Malay language via a two forward-backwards translation process involving four translators (Sousa & Rojjanasrirat 2011). All four were well versed in both English and Malay. This process includes translating individual items, the instructions for the questionnaire, and the response options. The final translated version was discussed among the translators to discuss on the suitability of the translations.

Content and Face Validity

The final translated version was then brought to a panel of experts consisting of a psychiatrist, a linguist, a public health specialist, and three computer science engineers. A content validity was done to measure subjectively and objectively on the suitability of the translation of the questionnaire for Malaysians aged 12 and above. This was conducted by an online survey inquiring on the relevance of the items within their domains. The experts were asked to score the items from 1 (Not Relevant) to 4 (Very Relevant). Items scored 3 or 4 were labelled as 1 (Relevant) and items scored 1 or 2 were labelled as 0 (Not Relevant). Content validity was measured via Content Validity Index (CVI) by calculating for the average score of items (Yusoff 2019).

The entirety of the respondents was asked on their understanding of the questions being asked in terms of sentence structure and the suitability of the words used. These questions were asked at the end of the questionnaire.

Procedures

This research was approved by the institution's Ethics Committee. Consent was also obtained from the Ministry of Education of Malaysia along with the state education department to involve secondary school students in this research. The permission to translate the SUQ-G & SUQ-A was obtained from the original author. The questionnaire was distributed via a Google Form link. Consent was obtained from the respondents and the parents of the secondary school students before they answered the questionnaire.

Psychometric Analysis

Descriptive analysis was performed using Statistical Package for the Social Sciences (SPSS) by the International Business Machines (IBM) Corporation, version 25.0 (IBM Corp, Armonk, NY, USA). The age range, distribution of ethnicities as well as gender, and mean score of the questionnaire were measured. The internal reliability was measured by calculating for the Cronbach's alpha value where a value >0.6 was considered reliable. A construct validity was assessed with principal component analysis (PCA).

RESULTS

A total of 195 respondents completed the questionnaire with an age range of 13-59 and a mean age of 17.4 (SD=5.075). More than half of the respondents were female (67.6%). The ethnicities of the respondents were Malay (n=110, 56.4%), Chinese (n=72, 36.9%) Indian (n=12, 6.2%), and Sikh (n=1, 0.5%). A large majority of the respondents used their phones daily (n=188, 96.4%) with an almost equal

Table 1: Content validation index (CVI) score

Item	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	I-CVI
SUQ-G1	1	1	1	1	1	1	1.00
SUQ-G2	1	1	1	1	1	1	1.00
SUQ-G3	1	0	1	1	0	1	0.67
SUQ-G4	1	1	1	1	1	1	1.00
SUQ-G5	1	1	1	1	1	1	1.00
SUQ-G6	0	0	0	1	0	0	0.17
SUQ-G7	1	0	1	1	1	1	0.83
SUQ-G8	1	0	1	1	0	1	0.67
SUQ-G9	1	1	1	1	1	0	0.83
SUQ-G10	1	1	1	1	1	1	1.00
SUQ-A1	1	1	1	1	1	0	0.83
SUQ-A2	1	1	0	1	1	1	0.83
SUQ-A3	1	1	1	1	1	1	1.00
SUQ-A4	1	1	1	1	1	1	1.00
SUQ-A5	1	1	0	1	1	1	0.83
SUQ-A6	1	1	0	1	1	1	0.83
SUQ-A7	1	1	0	1	1	1	0.83
SUQ-A8	0	1	0	1	1	1	0.67
SUQ-A9	1	1	1	1	1	1	1.00
SUQ-A10	1	1	1	1	1	1	1.00
						S-CVI/Ave	0.85

Table 2: Table of Eigenvalues and Total Variance

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total[a]	% of Variance	Cumulative %	Total[a]	% of Variance	Cumulative %
1	9.460	47.30	47.30	9.460	47.30	47.30
2	1.730	8.65	55.95	1.730	8.65	55.95
3	1.118	5.59	61.54	1.118	5.59	61.54

Extraction Method: Principal Component Analysis
[a]Eigenvalue

amount having internet access (n=190, 97.4%).

Validity Testing

Content and Face Validity

The CVI (Table 1) of the SUQ-Malay Version was calculated to be 0.85. Most of the respondents, 87.7%, understood the questions being asked. The response received regarding the misunderstood items were mostly due to some of the respondents' own vocabulary limitations of certain words used. An example was the word "sejurus".

Principal Component Analysis

Kaiser-Meyer-Olkin (KMO) test for the sampling adequacy was 0.921, and the Bartlett's test of sphericity was significant with a p-value of <0.001. The sample was proved adequate for factor analysis.

Three components were extracted having Eigenvalues of more than 1 accounting for 61.5% of the total variance (Table 2). However, the scree plot (Figure 1) showed only two components to extract before the graph starts to level off. Thus, only two components were extracted in this study.

The factor loading for each item is shown in Table 3. The factor loading matched the original questionnaire by (Marty-Dugas et al. 2018), except for item 20 which loaded under the "General Smartphone-Use" instead of the "Absent Minded Smartphone-
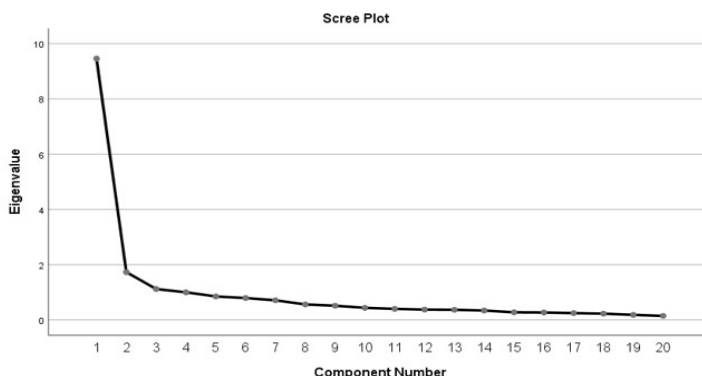

Figure 1: Scree plot of the PCA

Table 3: Factor loading and Cronbach alpha

Item	Factor Loadings	a*
General Smartphone-Use		0.884
1 - … ada pada diri anda?	0.681	
2 - … menghantar dan menerima teks mesej?	0.681	
3 - … notifikasi pada telefon anda?	0.748	
4 - … memerikasa telefon untuk perkara baru?	0.707	
5 - … membaca berita atau melayari laman web?	0.73	
6 - … bunyi notifikasi pada telefon anda?	0.56	
7 - … kerapkah anda akan memeriksanya serta-merta?	0.692	
8 - … menggunakan kalendar?	0.721	
9 - … memeriksa aplikasi media sosial?	0.676	
10 - … telefon anda untuk tujuan hiburan?	0.619	
20 - … masa berlalu semasa menggunakan telefon?	0.593	
Absent Minded Smartphone-Use		0.927
11 - … melakukan sesuatu yang berbeza tanpa anda sedari?	0.74	
12 - … sedang berinteraksi dengan orang lain?	0.681	
13 - … tanpa sebab yang bagus?	0.824	
14 - … memeriksa telefon anda tanpa tujuan?	0.862	
15 - … memeriksa telefon anda sebagai tabiat?	0.863	
16 - … tanpa anda sedari kenapa anda melakukannya?	0.853	
17 - … sejurus selepas menggunakannya?	0.81	
18 - … tanpa memberi perhatian sepenuhnya?	0.792	
19 - … lebih lama dari yang anda inginkan?	0.674	

*Cronbach alpha value

Use".

Internal Consistency

The SUQ Malay version showed an internal consistency in this study with an overall Cronbach alpha score of 0.94. The Cronbach alpha for the "General Smartphone-Use" domain was 0.88 and 0.93 for the "Absent Minded Smartphone-Use" domain (Table 3).

Bivariate Correlation

The score of SUQ-G was strongly and positively correlated (r=0.742, p=<0.0005) with the score of SUQ-A.

DISCUSSION

The Malay language is the national language of Malaysia and is thought in both primary and secondary schools. Demographically, the sample of this study was representative (Tsang et al. 2017) of the major ethnic groups in Malaysia at 56.4% for the Malays (Bumiputera), 36.9% for the Chinese and 6.2% for the Indians. This is in

comparison with Malaysia's actual major ethnic group breakdown at 69.3%, 22.8% and 6.9% for Bumiputera, Chinese and Indians, respectively (DOSM 2021), thus, ensuring the translation and adaptation was appropriate for all Malaysians and not just a single ethnic group.

The SUQ Malay version scored 0.85 on the CVI. A score above 0.83 indicates that all items in this questionnaire were relevant to their respective domains which were "General Smartphone-Use" and "Absent Minded Smartphone-Use" (Polit et al. 2007; Yusoff 2019). Item SUQ-G6 (…bunyi notifikasi pada telefon anda?) scored poorly in the content validation. The experts could not come to a consensus on the relevance of unmuting notifications as an item under the General Smartphone Use domain. However, the authors have an understanding that sound notifications may attract the user to pick-up the phone more frequently than a muted notification, as mentioned by (Chang & Tang 2015); thus, making this item relevant to be classified under the General Smartphone Use domain similarly as in the original English version.

All the items loaded similarly as the original English version except item SUQ-A10 which loaded almost equally on both "General Smartphone Use" and "Absent Minded Smartphone Use" components, at 0.593 and 0.562, respectively. To remain true to the original version (Marty-Dugas et al. 2018), item SUQ-A10 was left to be under the "Absent Minded Smartphone Use" component. The

Cronbach alpha score of this study for both "General Smartphone-Use" and "Absent Minded Smartphone-Use" components were good at 0.884 and 0.927, respectively. Scores above 0.7 for Cronbach alpha indicates the components of the questionnaire to be reliable (Devon et al. 2007). The sharing of similar items loaded into similar components may indicate no cultural difference between this Malay version with the original version.

The trend of smartphone use by our study participants was similar to that shown by the original author (Marty-Dugas et al. 2018), where the SUQ-G is strongly correlated to the SUQ-A. This may indicate that those who use their smartphones more often are more likely to use it absent-mindedly. Moreover, absent minded use of smartphone is not only a driving factor to inattention (Marty-Dugas et al. 2018), but also positively correlated with negative mood symptoms such as depression and anxiety (Marty-Dugas & Smilek 2020). Further research looking into the link between smartphone use behaviour and its effect on attention and mood symptoms would prove highly beneficial.

This study is not without limitations. Firstly, it was conducted only in the central zone of Malaysia. Previous research has shown a difference in the Malay language proficiency among students of different zones in Malaysia (Bakar et al. 2011); the understanding of the questionnaire may differ from one zone to another. Therefore, a more diverse combination of participants from different zones of Malaysia is recommended. Secondly, due to

the pandemic, the participants were given the questionnaire online. Those participated may use their smartphone devices more commonly than those who did not participate resulting in sampling bias.

CONCLUSION

The SUQ Malay version has good reliability and validity for further use in Malaysia. This version of the questionnaire can be used for participants ages 13 years and above.

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