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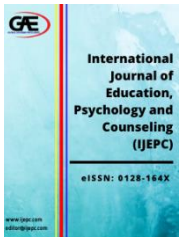

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MALAY VERSION OF THE MOTIVATED STRATEGIES FOR LEARNING QUESTIONNAIRE (MSLQ)

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Abstract:

Motivation plays a crucial role in the academic success of students, particularly in challenging courses like Statistics. In an effort to measure students' motivation in studying statistics courses, a study was developed based on the Motivated Strategies for Learning Questionnaire (MSLQ). The study focused on creating a translated version of the original questionnaire in Malay language to assess student motivation. An early analysis was conducted starting with Exploratory Factor Analysis to evaluate whether the translated instrument measured the motivational level as effectively as the original version of MSLQ. Following the factor analysis, the reliability analysis was performed to determine the reliability of the translated questionnaire. The results indicated that the translated instrument is a reliable measure of student motivation in studying statistics courses and supported the original version of MSLQ. However, there were some differences in the factor structure of the questionnaire, with certain items not being grouped in the same component as in the original version. These differences were attributed to language factors and differences in the educational environment. It is worth noting that the MSLQ has been extensively validated in various languages and educational settings and has been found to be a reliable and valid measure of student motivation in various subjects. By translating the MSLQ into Malay language, the researchers have contributed to the growing body of research on student motivation in Malaysia, which could potentially enlighten interventions and strategies to improve student outcomes in this region.

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Malay Language, MSLQ, Motivation, Factor Analysis

Introduction

Motivation is a complicated psychological concept that explains behavior and the amount of effort put forth in various activities (Watters, 2000). According to Dornyei (2001), motivation explains why people choose to do something, how hard they will pursue it, and how long they will be willing to sustain the action. It involves internal and external elements that motivate people to put up an effort to achieve a goal or to be consistently engaged and committed to a work, role, or subject (Gbollie & Keamu, 2017). As a critical component of academic performance, motivation plays a significant role in determining students outcomes. A qualitative study conducted by Mauliya et al. (2020) stated that poor academic performance among graduate students results from their lack of motivation. Students with great motivation would try their best in class even if the course content were challenging. On the other hand, students who lack drive will become bored and uninterested in learning, even if the materials provided are simple.

Several sets of questionnaires have been developed to measure students' motivation, but the most widely used is the Motivated Strategies for Learning Questionnaire (MSLQ) designed by Pintrich et al. (1991). The original MSLQ was developed in English, but this instrument has been translated into various languages in numerous studies in many countries all over the world (Duncan & McKeachie, 2005). Examples of studies using the translated MSLQ include Ilker (2014) for the Turkish version; Feiz and Hooman (2013) for Iranian students; Nausheen (2016) for postgraduate students in Pakistan; Saks et al. (2015) for Estonian students; Jakešová & Hrbáčková (2014) for Czech students; Kumar and Bhalla (2020) for the Indian population; Nomura et al. (2023) for third-year Japanese medical students and Wang, et al. (2023) for grade 11 students in Guangdong, China. The construct validity of the translated questionnaires in those studies varied, with some indicating that the translated version of the MSLQ exhibits the same structure as the original and can be considered a valid and reliable instrument, while others found discrepancies in the newly extracted factors compared to the original motivation scales of the MSLQ.

The original MSLQ was developed in English, but for this study, MSLQ has been translated into Malay language to enhance understanding and provide a more accurate assessment of the students' motivation levels. Translating and adapting psychological instruments like the MSLQ for different cultural contexts poses challenges, particularly concerning cross-cultural validity. Differences in language nuances, cultural interpretations of motivation, and educational environment can affect the instrument's accuracy. This raises questions about construct equivalence – whether motivational concepts have the same meaning or relevance across cultures (Van de Vijver & Tanzer, 2004). Given that social and cultural factors are believed to affect the validity of test results, it is possible to argue that the Malay version of MSLQ may yield different outcomes among Malaysian university students, whose cultural backgrounds differ from those of Western students. Moreover, considering that the original MSLQ was developed in 1991, questions arise about its longitudinal validity and whether it still captures

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all relevant aspects of student motivation in the current, rapidly evolving educational landscape.

Despite this concern, there has been limited research in Malaysia that utilizes the Malay language version of MSLQ among students. Khosim and Awang (2020) conducted a study on 395 secondary students from native communities in the state of Perak. The study's results revealed that only three factors, namely Self-Efficacy, Intrinsic Value, and Test Anxiety (consisting of 22 items), were extracted from the motivation dimension. This finding revealed variations in the factor structure of the MSLQ when applied to Malaysian secondary students from native communities. Given the cultural diversity within Malaysia, it is essential to validate the MSLQ for different educational levels and cultural groups.

Therefore, this research aims to validate the 31 items of the motivation scale in the Malay version of MSLQ, specifically applied to university students. Additionally, the study aims to provide reliable evidence for the motivation subscales of this questionnaire taking into account the unique cultural, social, and educational context of Malaysia.

Methodology

Participants & Data Collection

The study involved 178 diploma students enrolled in statistics courses at the College of Computing, Informatics and Media, Universiti Teknologi MARA, Perak Branch, Malaysia. Data collection occurred during March-July 2022 academic session. The participants were selected based on their enrolment in statistics courses which are widely recognized as challenging subjects often associated with low academic success rate. Knowing that motivation affects academic success, this study set out to examine how motivated students were in Statistical Methods (semester three) and Fundamentals of Statistics (semester one) courses.

The researchers utilized the Google Forms platform to administer the questionnaire, asking students to report their motivational beliefs concerning the statistics course taken in the current semester. The collected data were processed and analyzed using IBM SPSS statistical analysis software version 28, where Exploratory Factor Analysis and Reliability Analysis were used for further examination.

Instrument

The Motivated Strategies for Learning Questionnaire (MSLQ) is an instrument developed by Pintrich and colleagues to assess students' motivational orientations and their use of different learning strategies for a college course (Pintrich et al., 1991). This instrument comprises 81 items and is divided into two sections: a motivation section and a learning strategies section. However, only the motivation section was used in this study. The motivation section comprises three dimensions (value, expectancy, and affective) with 31 items subdivided into six subscales: Intrinsic Goal Orientation, Extrinsic Goal Motivation, Task Value, Control Beliefs, Self-Efficacy for Learning and Performance, and Test Anxiety. Figure 1 shows the conceptual framework of the motivation scale with six subscales in MSLQ.

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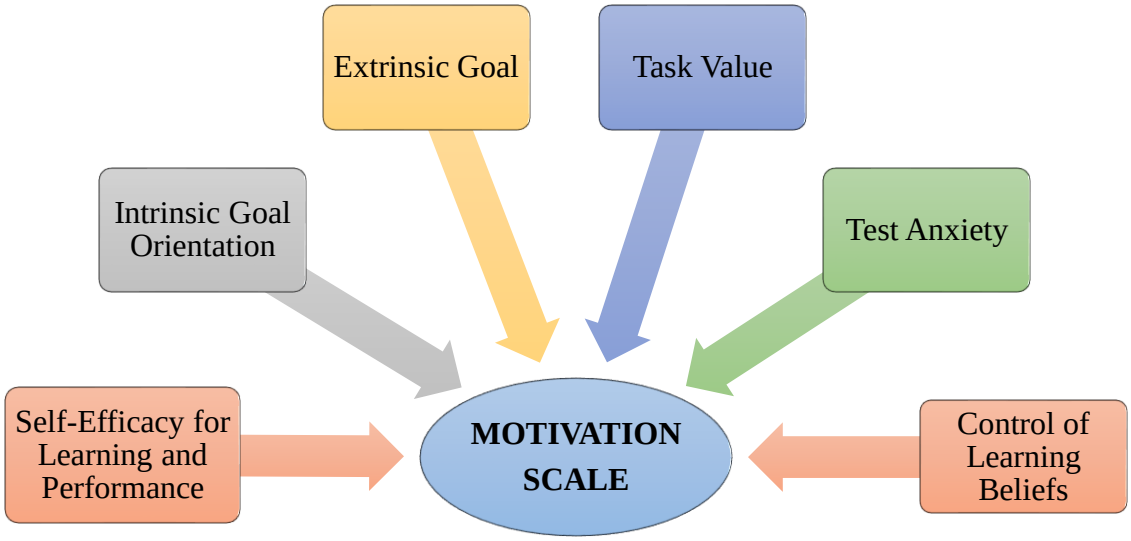

Figure 1: Conceptual Framework of Motivation Scale in MSLQ Developed by Pintrich et al. (1991)

Using a seven-point Likert-type scale, responses to MSLQ items ranged from 1 (Not at all true for me) to 7 (Very true for me). In general, a higher score, such as a 4, 5, 6, or 7, compared to a lesser score, such as a 1, 2, or 3, indicates a higher level of motivation. The Exam Anxiety scale is the only exception, where a high score reflects problematic levels of motivation due to the negative nature of the items.

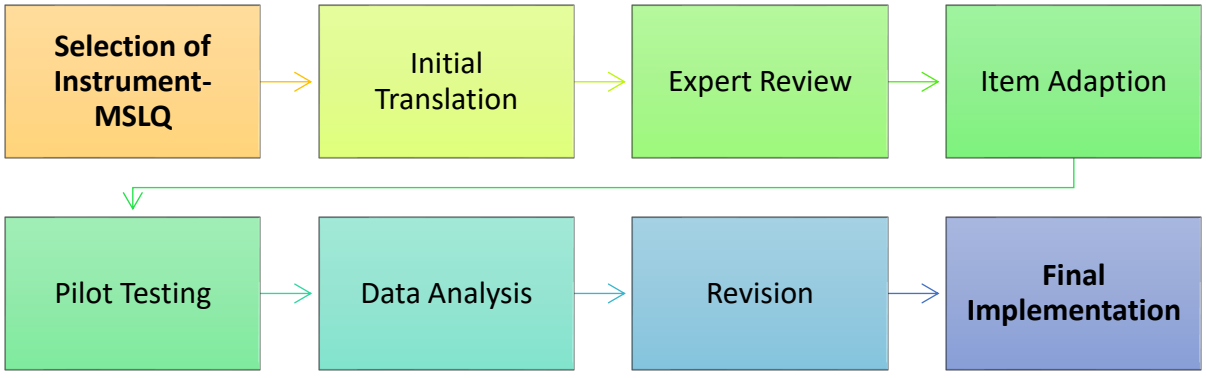

Figure 2: Flowchart of Translating and Adapting the Motivated Strategies for Learning Questionnaire (MSLQ) to Malay language

The process of translating and adapting the Motivated Strategies for Learning Questionnaire (MSLQ) begins with selecting the instrument and translating 31 items related to motivation into the Malay language. The translated items were carefully reviewed by researchers to ensure that each item measures the same construct as the original items and fits the Malaysian educational context. An expert review was conducted to ensure construct equivalence and cultural relevance. Following this, the adapted version underwent pilot testing with a group of

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60 students to assess the clarity of the items and identify any issues. The data from this pilot test were analysed to evaluate the reliability of the instrument. Based on the findings, necessary revisions were made, resulting in the final version of the translated MSLQ, which was then implemented in this study.

Analysis & Results

Exploratory Factor Analysis: Stage 1

All 31 items of the Malay version of MSLQ were analyzed using Exploratory Factor Analysis with IBM SPSS version 28. The adequacy of the data for factor analysis was evaluated before performing factor analysis. Table 1 displays the Kaiser-Meyer-Olkin value, which was 0.907, higher above the suggested value of 0.6 (Tabachnick & Fidell, 2013). Additionally, the Bartlett's Test of Sphericity achieved statistical significance ($p < .001$). These results revealed that the data was suitable for factor analysis. After confirming the data's suitability, Exploratory Factor Analysis was applied with Varimax rotation.

Table 1: Kaiser-Meyer-Olkin Measure and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		**.907**
Bartlett's Test of Sphericity	Approx. Chi-Square	12.094
	Degree of freedom	5.346
	Sig.	.000

The next step was to determine the number of factors to be extracted. Keiser criterion suggests that all factors with an eigenvalue above 1 should be retained (Kaiser, 1960). This rule identified six factors with eigenvalues of 1 or higher which is Component 1 to Component 6 as shown in Table 2.

Table 2: Total Variance Explained

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	11.564	37.302	37.302
2	3.749	12.094	49.395
3	1.657	5.346	54.741
4	1.226	3.954	58.695
5	1.104	3.561	62.256
6	1.095	3.534	65.790
7	.993	3.202	68.992
8	.892	2.878	71.870
9	.743	2.396	74.265
10	.727	2.345	76.610
11	.669	2.159	78.769
12	.615	1.985	80.754
13	.567	1.829	82.583
14	.511	1.647	84.230
15	.483	1.557	85.787
16	.462	1.491	87.278

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17	.424	1.367	88.645
18	.405	1.307	89.952
19	.371	1.196	91.148
20	.347	1.119	92.267
21	.326	1.053	93.320
22	.284	.917	94.237
23	.278	.897	95.135
24	.269	.868	96.003
25	.238	.768	96.771
26	.202	.652	97.423
27	.181	.583	98.006
28	.174	.561	98.567
29	.159	.514	99.081
30	.145	.469	99.550
31	.139	.450	100.000

Extraction Method: Principal Component Analysis

The Varimax rotation method was performed to aid in interpreting these six components. The rotated solution revealed the six components but with the presence of unclear factors structure, as illustrated in Table 3.

Table 3: Rotated Component Matrix

	Component					
	1	2	3	4	5	6
M5	.865					
M6	.836					
M29	.798					
M15	.771					
M20	.731					
M4	.645					
M12	.633					
M31	.602					
M27	**.535**	**.410**		**.472**		
M10		.723				
M18		.709				
M11		.699				
M21		.698				
M22	.417	.626				
M7		.610				
M23		.590		.553		
M26		.572		.483		
M30		.547				
M2		.448				
M19			.804			
M3			.781			
M28			.760			

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M8			.736			
M14			.685			
M24				.807		
M17	**.468**	**.422**		**.503**		
M13				.445		
M16					.769	
M1					.634	
M9						.795
M25						.458

According to Table 3, nine items strongly load onto Component 1, namely items M5, M6, M29, M15, M20, M4, M12, M31, and M27. In the original MSLQ, items M5, M6, M29, M15, M20, M12, and M31 measure the Self-Efficacy subscale, while items M27 and M4 measure the Task Value subscale. Therefore, Component 1 can be named Self-Efficacy since most of the items (7 out of 11) measure Self-Efficacy. In this component, item M22 and M17 were excluded because they have a loading of less than 0.5.

Next, 11 items strongly load onto Component 2, and in the original MSLQ, these items measure multiple subscales, namely Task Value, Extrinsic Value, Intrinsic Value, and Control Belief. This makes it difficult to identify the real name for Component 2.

The only component structure that can be seen clearly is Test Anxiety. All original MSLQ items (M19, M3, M28, M8, and M14) that measure Test Anxiety loaded strongly on Component 3 without any cross-loading with other components. Therefore, Component 3 can be confidently named Test Anxiety.

As can be seen in Table 3, several items were loaded at more than 0.3 on more than one component. For example, items M27 and M17 were loaded on three components: Components 1, 2 and 4, while items M23 and M26 were loaded on Components 2 and 4. According to Tabachnick and Fidell (2013), an item that loads at 0.32 or higher on two or more components is called a "cross-loading" item. Cross-loading items should be studied for their conceptual clarity, particularly if they cross-load significantly on many factors (above 0.3) as suggested by Costello and Osborne (2005). Stevens (2012) explains that cross-loading items in factor analysis can be problematic because they may reflect a number of unrelated characteristics and make it more difficult to evaluate the factor structure. Pett, Lackey, and Sullivan (2003) recommend that items with problematic loadings in factor analysis should be eliminated one at a time, with a new factor analysis run after each elimination. After the item was eliminated, a new factor solution is needed to re-examine the remaining items.

After careful discussion among all researchers involved, we conducted several multiple factor analyses, each time removing one problematic item. In total, five items were eliminated, resulting in a final set of 26 items for analysis. The aim of eliminating these items was to improve the component structure and arrive at a final structure that is both empirically and conceptually supported. The eliminated items are: M2, M4, M13, M21 and M22.

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Exploratory Factor Analysis: Stage 2

After removing the five items, factor analysis was re-run using a sample with 26 items, and the output result was observed and analysed. Again, the sample was first assessed for its suitability for factor analysis. Bartlett's Test of Sphericity was highly significant ($p<0.001$) and the Kaiser-Meyer-Olkin (KMO) value is 0.895, exceeding the recommended value of 0.6. Therefore, this data is suitable for factor analysis (see Table 4).

Table 4: Kaiser-Meyer-Olkin Measure and Bartlett's Test (Stage 2)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.895
Bartlett's Test of Sphericity	2721.223	12.094
	325	5.346
	.000	.000

Table 5 shows the extraction method using Principal Component Analysis. In the Initial Eigenvalues/Total column, there are six eigenvalues that are greater than 1 explaining 35.815%, 14.078%, 6.029%, 4.653%, 4.145% and 3.994% of the variances, respectively. This method reveals the presence of six components or six factors to be extracted from the table. To aid in the interpretation of these six components, varimax rotation was performed. The rotated solution in Table 6 revealed the presence of a simple structure with all components showing a number of strong loadings.

As can be seen in Table 6, items M5, M6, M29, M15, M20, M12, and M31 loaded strongly on Component 1. According to the original MSLQ, all these items measure Self-Efficacy for Learning and Performance. The first component was thus named Self-Efficacy For Learning And Performance. Next, items M10, M11, M18, M7, and M30 load strongly on Component 2. In the original MSLQ, items M7, M11, and M30 measure Extrinsic Goal Orientation while item M10 measures Task Value and item M18 measures Control Belief. A review of the content of items M10 and M18 revealed a similar appearance to the other three, as it explicitly refers to the passion for learning and understanding the course material. Component 2 which consists of items M10, M11, M18, M7, and M30 was thus named Extrinsic Goal Orientation.

Table 5. Total Variance Explained

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	**9.312**	**35.815**	**35.815**
2	**3.660**	**14.078**	**49.892**
3	**1.568**	**6.029**	**55.922**
4	**1.210**	**4.653**	**60.574**
5	**1.078**	**4.145**	**64.719**
6	**1.038**	**3.994**	**68.713**
7	.889	3.418	72.131
8	.724	2.786	74.917
9	.686	2.639	77.556
10	.587	2.258	79.813
11	.554	2.132	81.945
12	.533	2.051	83.996

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13	.512	1.969	85.966
14	.441	1.698	87.664
15	.421	1.618	89.282
16	.370	1.424	90.706
17	.334	1.286	91.992
18	.330	1.269	93.260
19	.296	1.140	94.401
20	.290	1.115	95.516
21	.272	1.048	96.563
22	.221	.850	97.413
23	.185	.712	98.125
24	.171	.657	98.782
25	.167	.642	99.425
26	.150	.575	100.000

Extraction Method: Principal Component Analysis.

The third component consisted of five items (M19, M3, M28, M8 and M14) that measured Test Anxiety (Refer to Table 6). These items are the same as the subscale in the original MSLQ, indicating that the Test Anxiety construct was effectively operationalized with the current sample.

Component 4 obtained high loadings on five items, as shown in Table 6. According to the original MSLQ, items M17, M23, M26 and M27 measure Task Value whereas item M24 measures Intrinsic Goal Orientation. Item M24 however was a close match to the other four items as it asked about the assignment (task) in the course taken. Therefore, this item was retained in Component 4, and that component was given the name as Task Value.

Table 6: Rotated Component Matrix (second stage)

Component	Items	Factor loading	Component	Items	Factor loading
1	M5	.870	2	M10	743
	M6	.827		M11	.739
	M29	.808		M18	.685
	M15	.776		M7	.637
	M20	.756		M30	.480
	M12	.653	4	M24	.760
	M31	.609		M23	.636
3	M19	.809		M17	.581
	M3	.778		M27	.578
	M28	.766		M26	.530
	M8	.741	6	M9	.833
	M14	.689			
5	M16	.783		M25	.578
	M1	.583			

Component 5, named Intrinsic Goal Orientation, consisted of two items (M16 and M1). The last component, named Control Belief, also comprised two items (M9 and M25) measuring

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Control Belief in the original MSLQ. Although both components consisted of only two items, the authors decided to retain them in the study due to their theoretical relevance and significance.

Table 7: Comparison items in each component between the original MSLQ and Malay Version of MSLQ

Subscale	Pintrich et al. (1991) (Original MSLQ)	Malay Version of MSLQ	Changes made in Malay Version of MSLQ	
			Item removed from original sub-scale	Item added in original sub-scale
Self-Efficacy for Learning and Performance (Component 1)	5, 6, 12, 15, 20, 21, 29, 31	**5, 6, 12, 15, 20, 29, 31**	21	-
Extrinsic Goal Orientation (Component 2)	7, 11, 13, 30	**7, 11, 30, 10,18**	13	10,18
Test Anxiety (Component 3)	3, 8, 14, 19, 28	**3, 8, 14, 19, 28**	-	-
Task Value (Component 4)	4, 10, 17, 23, 26,27	**17, 23, 26, 27,24**	4,10	24
Intrinsic Goal Orientation (Component 5)	1, 16, 22, 24	**1,16**	22, 24	-
Control of Learning Beliefs (Component 6)	2, 9, 18, 25	**9, 25**	2,18	-
Total Items	31	**26**		-

The revised constructs in the Malay version of MSLQ and their corresponding items are summarized in Table 7. Items 22, 13, 4, 2, and 21 were completely removed from the motivation scale due to not loading on the correct component as suggested by the original MSLQ. Items 10, 18, and 24 were loaded on a new component, different from the component suggested by the original MSLQ, and were retained in that new component. In total, five items were removed from the list, while three items loading on a different component were left to remain in the new component, resulting in 26 items used in the final analysis. Overall, the results of this analysis support the existence of the six subscales in the motivation section, as suggested by Pintrich et al. (1991), with some modifications to the items.

Reliability Analysis

To assess the validity of the MSLQ Malay version questionnaire set, reliability analysis was conducted using a commonly used method called internal consistency. According to Pallant (2020), internal consistency is the degree to which the items that make up the scale are all measuring the same underlying attribute. To measure the internal consistency of a scale, the Cronbach alpha coefficient was used, which is expressed as a number between 0 and 1. DeVellis (2021) recommends that the ideal value of the Cronbach's alpha coefficient for a scale should be above 0.7.

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Table 8 shows that the Malay version of MSLQ has six subscales with good internal consistency, as indicated by Alpha Cronbach coefficients ranging between 0.617 and 0.888. These alpha values are similar to those reported for the original instrument. Although the alpha coefficients for Intrinsic Goal Orientation and Control of Learning Belief are below 0.7, they are still considered acceptable since the original MSLQ also has values below 0.7 but above 0.6.

Table 8: Cronbach's Alpha Reliability For Motivation Scale in MSLQ

Subscale	Original MSLQ by Pintrich et al. (1993)	Malay Version of MSLQ
Intrinsic Goal Orientation	0.74	0.617
Extrinsic Goal Orientation	0.62	0.799
Task Value	0.90	0.867
Control of Learning Beliefs	0.68	0.643
Self-Efficacy for Learning & Performance	0.93	0.888
Test Anxiety	0.80	0.838

Conclusion

This study aimed to validate the Malay version of the Motivated Strategies for Learning Questionnaire (MSLQ) for assessing motivation levels among university students. The objectives of the study were achieved, as the results demonstrated that the 26-item Malay version of the MSLQ is a valid and reliable instrument. As measured by Cronbach's Alpha, the reliability assessment yielded values ranging from 0.617 to 0.888, mirroring the range observed in the original scale (0.62 to 0.93). The outcomes of this study support Pintrich's suggestion in the original MSLQ that there are six subscales in the motivation scale (Pintrich et al., 1991). However, only 26 items were used in this study since five items with problematic loadings were removed to improve the component structure and achieve a component structure that is both philosophically and practically validated.

The identification of six distinct motivation subscales, namely Intrinsic Goal Orientation, Extrinsic Goal Orientation, Task Value, Control of Learning Beliefs, Self-Efficacy for Learning and Performance, and Test Anxiety—further strengthens the Malay version of the MSLQ as a flexible instrument that accommodates sophisticated evaluation in learning environments. In essence, this study affirms the Malay version of the MSLQ as a reliable, adaptable, and empirically validated instrument positioned to facilitate research, guide teaching practices, and empower students in their academic pursuits.

The main contribution of the study is the development of a flexible, validated, and trustworthy tool for assessing motivation among Malaysian university students. The Malay version of MSLQ can facilitate research, guide teaching practices, and empower students by providing information about students' motivational strengths and weaknesses. The information gathered through the MSLQ can help educators develop targeted interventions to enhance student motivation and academic performance.

For future studies, this instrument will be distributed among students taking statistics courses to investigate their learning motivation levels. After completing the MSLQ, students will receive feedback on their motivation levels, helping them identify areas for improvement. The

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results are expected to assist students in seeking support from lecturers or utilizing counselling services available in campus.

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