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Analyzing Validity and Reliability of Motivational Orientation of Differentiated Instruction in English Language Teaching Student Questionnaire (MoDiELT)

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Abstract

Recently, the implementation of differentiated instruction had been proposed by Ministry of Education of Malaysia to be implemented across all schools in the country. Consequently, as announced in the Malaysia Education Blueprint (2013) the Ministry had launched a program called Differentiated Teaching and Learning of English Language. After few years of its implementation, a measurement protocol was needed to assess the effectiveness of differentiated teaching approach in the teaching and learning of English language. In this instance, a multidimensional instrument was developed to measure student motivation toward differentiated teaching and learning of English language, and indicate teachers' overall teaching performance. The questionnaire contains three sections A (Demography), B (78-item scale assessing student motivation based on their experience of differentiated English language teaching and learning), and C (Student Comment/Suggestion). In this paper, the researcher presents the procedures involved in evaluating the psychometric properties of the instrument and discusses its validity and reliability. The items were constructed based on an accumulation of teachers' differentiated teaching strategies. Face and content validity were evaluated while internal consistency and factor analyses were computed. The final reliability coefficients for the whole scale and subscales range from high to very high, while changes suggested by the analyses were accepted. The overall analysis suggested that the questionnaire is deemed valid and reliable to measure student motivation toward differentiated teaching and learning of English language, and as an indicator of teachers' performance in applying differentiated approach.

Keywords: Differentiated instruction; English language teaching; Reliability; Validity; Questionnaire.

1. Introduction

Differentiated instruction has been widely practiced at schools in teaching and learning various school subjects at various grade levels. This pedagogical approach provides modification in the pedagogical components i.e. content, process, and product, based on learner readiness, interest, and learning profile, thus depict variation of classroom activities that cater for every individual learner needs.

Recently, the Ministry of Education of Malaysia had proposed the implementation of differentiated instruction across all schools in the country. Consequently, as announced in the Ministry of Education (2013), the Ministry had launched a program called Differentiated Teaching and Learning of English Language. After few years of its implementation, a measurement protocol was needed to assess the effectiveness of differentiated instruction in the teaching and learning of English language.

In this regard, a valid and reliable instrument is needed to provide empirically sound assessment on the effects of differentiated instruction on students. Many studies on differentiated instruction have revealed potential effects of this teaching approach on student learning outcome. Some studies have highlighted increased motivation among learners (Anderson, 2007; Bailey and Williams-Black, 2008; York-Barr *et al.*, 2007). Since motivation has been regarded as one of the important constructs in English language teaching and learning, this established construct was utilized as the effect. In this article, the researcher presents the procedures undertaken in developing a valid and reliable instrument that measures student motivation having experienced differentiated English language teaching and learning.

2. Literature Review

As differentiation has definitely gained its place in the academia (Rock *et al.*, 2008), its challenges continue to surface. Vansciver (2005), asserts that differentiation is complex that it is difficult to implement. According to Tomlinson (2000), despite "all of its purported outcomes, differentiation however is complex to use and difficult to promote in schools" (p.26). Consequently, schools commonly reported that teachers do not seem to sufficiently differentiate their lessons (Tomlinson, 2008). In relation to this, Rock *et al.* (2008), revealed in a study that teachers'

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determination to cater for every learner's needs through differentiation was put down due to excessive workload responsibilities, demands for substantial content coverage, and negative classroom behavior (p.34).

Most importantly, many researches on differentiated instruction have highlighted the connection between particular instructional strategies and student motivation. A qualitative study assessing students, teachers, and parents' input on the practice of differentiated instruction found positive impact on students' growth (Gibson, 2005). Some studies described in their findings that differentiated instruction develops independence, competences, and the self-images of students (Lavadenz and Armas, 2008; Valiende and Koutselini, 2009). This can be explained as the results of providing appropriate challenge through differentiated instruction, because it keeps students highly engaged in learning (Palmer and Maag, 2010; Reis and Renzulli, 2010). This is indeed true because differentiated instruction leads students into interacting in social-like activities that provide them with necessary challenges that initiate the students to take charge of their learning, and thus, become motivated (Anderson, 2007; Bailey and Williams-Black, 2008; York-Barr *et al.*, 2007).

Despite the existing studies revealing beneficial effects on learners, little is known of an appropriate measurement tool assessing the relative effects of differentiated instruction on student learning outcome in general, and especially of student motivation having experienced such pedagogical approach. These studies gathered the findings by means of perspectives from teachers and students through qualitative data collection methods such as interviews. In addition to that, while most instruments measure student motivation toward instructional practices in regular second language classroom, an instrument specifically measuring student motivation toward the use of differentiated instruction in English language teaching is needed. Thus, an empirically sound instrument that is capable to measure the motivational effects of differentiated instruction on students would bridge this gap. An empirically valid and reliable instrument measuring the effects of differentiated instruction on students, particularly of their motivation would provide valuable information for educators alike. The next section presents the process involved in developing a multidimensional questionnaire measuring student motivation toward the use of differentiated instruction strategies in English Language Teaching. This questionnaire was developed in order to answer the research question of the main study i.e. *how does differentiated instruction strategies relate to student motivation*?

3. Methods and Procedures

The purpose of this article is to present the process of instrument validation, in particular, a questionnaire called MoDiELT. These include assessing the *translational validity*, *construct validity*, and *internal consistency* of the instrument. In doing so, several methods were employed i.e. validating the content and face validity, factor analysis, and analyzing the internal consistency of the draft of MoDiELT. The questions guided this purpose was *How does* MoDiELT *reliable and valid in measuring student motivation toward the use of differentiated instruction strategies in English Language Teaching?*

3.1. The Instrument: Modielt

The format of the questionnaire was adapted from Guilloteaux and Dornyei (2008) Student Motivational State questionnaire scored on a Likert scale. The items pooled on the draft of MoDiELT were constructed based on the findings of a qualitative study exploring differentiated instruction strategies. Nine strategies were derived from the study. These nine strategies were then grouped tentatively according to Dörnyei (2001) L2 Motivational Teaching Components i.e. i) *creating basic motivational condition,* ii) *generating initial motivation,* iii) *maintaining and protecting motivation,* and iv) *encouraging positive self-evaluation*.

Table-1. Number of items on MoDiELT

Dornyei's L2 Motivational Teaching Components	**Findings of DI strategies guided by Tomlinson's Model of DI**		**Number of Items**
Creating the basic motivational conditions	A	Interest	6
	B	Readiness	13
Generating initial motivation	C	Learning profile	10
	D	Generic	11
Maintaining and protecting motivation	E	Content	8
	F	Process	9
	G	Flexible Grouping	8
Encouraging positive self-evaluation	H	Product	6
	I	Ongoing Assessment/Adjustment	7
Total number of items			78

The draft questionnaire, thus, is a multidimensional scale that consists of three sections A (Demography), B (78-item scale assessing student motivation based on their experience of differentiated English language teaching and learning), and C (Student Comment/Suggestion). The main concern of this article is section B. The 78-item scale contains four main subscales namely 1) *creating basic motivational condition,* 2) *generating initial motivation,* 3) *maintaining and protecting motivation,* and 4) *encouraging positive self-evaluation* which are Dörnyei (2001), L2 Motivational Teaching Components. Nine sections of differentiated instruction strategies were aligned against the

four subscales tentatively i.e. subject to change based on the suggestions from the factor and internal consistency analyses. The list of items can found in Appendix 1.

3.2. Participants

In order to validate the instrument, two pilot studies: i) initial pilot study, and ii) main pilot study, were conducted. The initial pilot study was meant for evaluating the content and face validity of the instrument. Six experts were consulted about the content of the instrument, while 47 students of Pusat PERMATApintar Negara, UKM, participated in the initial pilot study to determine the face validity of the instrument.

In the main pilot study, a bigger sample was required to qualify for factor analysis that refine the construct validity of the instrument. For this purpose, 180 students of SMK Tun Telanai, Kuala Terengganu, participated in the main pilot study.

4. Results

4.1. Validity

4.1.1. Face Validity

Face validity, even though considered as the weakest form of validity, assesses the physical appearance of a questionnaire pertaining to its feasibility, readability, formatting, and the language (DeVon, 2007; Trochim, 2001). The usability of MoDiELT questionnaire was determined via the initial pilot study conducted on 47 students at Pusat PERMATApintar Negara, UKM, Bangi, Selangor. Upon the completion of the piloting, the researcher found that the students:

a) had no difficulty with the wording, or language, used,
b) Were able to complete the questionnaire without assistance.

4.1.2. Content Validity

This measure was conducted in order to assess the appropriateness of the content of the questionnaire vis-à-vis the purpose of the main study i.e. specifically to investigate the relationship between student motivation as the result of differentiated teaching and learning of English language. In determining content validity of a scale, the items should reflect the attribute under study and sent for expert review (DeVon, 2007). In doing so, the researcher conducted a through literature review of motivation and differentiated instruction in order to produce a conceptual framework specific for the intent of this study. A total of 6 reviewers agreed to assist the researcher in coming up with a more inclusive and valid instruments. The reviewers were approached first personally to seek their agreement and interest. The researcher sought for the expertise of these reviewers based on their merits as described in their experience involving with the following:

a) involvement in researches related to English language and the teaching of English language
b) involvement in the teaching of English language
c) involvement as an inspectorate of the teaching of English language
d) involvement in the development of survey instruments related to English language and the teaching of English language

The reviewers verified the content validity of the questionnaire that the items were appropriate to the conceptual framework i.e. motivation toward differentiated instruction strategies.

4.2. Reliability

4.2.1. Internal Consistency

The data gathered form the pilot study was keyed into SPSS version 20. Table 2 below shows the *output* of the *Item-total statistics* for the differentiated instruction categories confined to their respective L2 Motivational Teaching Components. Based on this *output*, the decision to drop items was based on the criteria by Gable and Wolf (1993) as in the following priorities:

i) The overall alpha value for each category must be at least 0.70, but the value of 0.80 and above are better,
ii) The *corrected item-total correlation* must be at least 0.20,
iii) The items neither have too low nor too high min value, as well as low standard deviation.

Thus, it was revealed that the Cronbach's Alpha values for each element (Total:9) and each component (Total:4) before and after the items were dropped are shown in Table 2 below. Ten items i.e. B15, B17, B18, G62, G63, G65, E41, F57, I78, and H68 were suggested to be deleted.

Table-2. Item Reliability based on Each Element of DI in Each L2 Motivational Teaching Component

DI Elements and L2 Motivational Teaching Components	Items	Reliability coefficient (before)	Items deleted based on *corrected item-total correlation* <0.20	Reliability coefficient (after item deletion)
A) Interest: Teacher establishes learner interest in lesson	A1 to A6	0.666 (6 items)	-	0.666 (6 items)
B) Readiness: Teacher bases lesson on learner readiness	B7 to B19 (B15 and B17 – negative items)	0.634 (13 items)	B15, B17, B18	0.793 (10 items)
Creating the basic motivational conditions	All A and B	0.729 (19 items)	B15, B17, B18	0.819 (16 items)
C) Learning profile: Teacher bases lesson on learning profile	C20 to C29	0.829 (10 items)	-	0.829 (10 items)
D) Generic: choice, monitor, reward	D30 to D40	0.798 (11 items)	-	0.798 (11 items)
Generating initial motivation	All C and D	0.881 (21 items)	-	0.881 (21 items)
E) Content: Teacher varies the content based on the theme / topics	E41 to E48	0.749 (8 items)	E41	0.767 (7 items)
F) Process: Teacher varies the process	F49 to F57 (F57 – negative item)	0.673 (9 items)	F57	0.746 (8 items)
G) Flexible grouping: Teacher varies the group style	G58 to G65	0.491 (8 items)	G62, G63, G65	0.514 (5 items)
Maintaining and proctecting motivation	All E, F, G	0.795 (25 items)	G62, G63, G65, E41, F57	0.830 (20 items)
H) Product: Teacher varies the product	H66 to H71	0.594 (6 items)	H68	0.635 (5 items)
I) On-going assessment / adjustment: Teacher provides on-going assessment / adjustment	I72 to I78	0.642 (7 items)	I78	0.665 (6 items)
Encouraging positive self-evaluation	All H and I	0.744 (13 items)	I78, H68	0.763 (11 items)
Overall (A, B, C, D, E, F, G, H, I)		0.933 (78 items)	B15, B17, B18, G62, G63, G65, E41, F57, I78, H68	0.944 (68 items)

In order to refine the validity of MoDiELT, the item correlation with the total mean of all the elements of DI strategies in each L2 Motivational Teaching component were analyzed. In doing so, correlation coefficient procedure used to measure the strength of the correlation between dependent variables called *bivariate correlations* was applied. Descriptions of the coefficient values generated here were based on Davies (1971) interpretations of correlation coefficient values (r) as in the followings:

1.00 is perfect,
0.70 – 0.99 is very high,
0.50 – 0.69 is high,
0.30 – 0.49 is moderate,
0.10 – 0.29 is low
0.01 – 0.09 means that it can be dismissed.

4.2.2. Item Correlation with Total Means of Component 1: *Creating the Basic Motivational Conditions* (Elements A and B)

The Pearson's correlation analysis between items and total means of component 1 *creating the basic motivational conditions* is shown in Table 3 below. The analysis found that there were both significant and insignificant relationships between items and total means of component 1.

The results of Pearson's correlation between items of elements A *Interest* and B *Readiness* indicate significant relationships at moderate level, ranging from 0.477 – 0.670, $p<0.01$, and 0.357 – 0.695, $p<0.01$, respectively.

However, while item B15 was deleted because it did not correlate with the total mean of component 1, items B17 and B18 were deleted due to low level of significance. Thus, all of the items for element A *Interest* and B

Readiness were retained except B15, B17, and B18. These three items of element B *Readiness* were omitted from component 1.

Table-3. Item Correlations with Total Means of Component 1 *Creating the basic motivational conditions*

Component 1	Elements	Items	Correlation coefficient (Pearson)	Results	Items	Correlation coefficient (Pearson)	Results
Creating basic motivational conditions	A) Interest	A1	.477**	Retained	A4	.603**	Retained
		A2	.626**	Retained	A5	.643**	Retained
		A3	.654**	Retained	A6	.670**	Retained
	B) Readiness	B7	.588**	Retained	B14	.511**	Retained
		B8	.695**	Retained	B15	.050	Deleted
		B9	.670**	Retained	B16	.537**	Retained
		B10	.651**	Retained	B17	-.231**	Deleted
		B11	.543**	Retained	B18	.276**	Deleted
		B12	.484**	Retained	B19	.357**	Retained
		B13	.617**	Retained			

**p<0.01

4.2.3. Item Correlation with Total Means of Component 2: *Generating Initial Motivation* (Elements C and D)

The Pearson's correlation analysis between items and total means of component 2 *Generating initial motivation* is shown in Table 4 below. The analysis revealed significant relationships between items and total means of component 2 *Generating initial motivation.* The results of the Pearson's correlation between items of the elements C *Learning profile* and D *Teacher allows choice, teacher monitors, teacher rewards* indicate significant relationships at mediocre to very high levels, ranging from 0.458 – 0.745, p<0.01, and 0.486 – 0.679, p<0.01, respectively. Thus, all items for elements C *Learning profile* and D *Teacher allows choice, teacher monitors, teacher rewards* are retained.

Table-4. Item Correlations with Total Means of Component 2 *Generating initial motivation*

Component 2	Elements	Items	Correlation coefficient (Pearson)	Results	Items	Correlation coefficient (Pearson)	Results
Generating initial motivation	C) Learning profile	C20	.626**	Retained	C25	.458**	Retained
		C21	.745**	Retained	C26	.660**	Retained
		C22	.659**	Retained	C27	.659**	Retained
		C23	.652**	Retained	C28	.609**	Retained
		C24	.654**	Retained	C29	.560**	Retained
	D) Teacher allows choice, teacher monitors, teacher rewards	D30	.486**	Retained	D36	.630**	Retained
		D31	.622**	Retained	D37	.493**	Retained
		D32	.653**	Retained	D38	.593**	Retained
		D33	.519**	Retained	D39	.497**	Retained
		D34	.622**	Retained	D40	.553**	Retained
		D35	.679**	Retained			

**p<0.01

4.2.4. Item Correlation with Total Means of Component 3: *Maintaining and Protecting Motivation* (Elements E, F and G)

The Pearson's correlation analysis between items and total means of component 3 *Maintaining and protecting motivation* is shown in Table 5 below.

The analysis revealed both significant and insignificant relationships between items and total means of component 3 *Maintaining and protecting motivation.* The results of the Pearson's correlation between the items of elements E *Content*, F *Process*, and G *Flexible grouping* indicate a range of moderate to very high levels of significance, ranging from 0.388 – 0.760, p<0.01, 0.526 – 0.656, p<0.01, dan 0.304 – 0.571, p<0.01, respectively. Thus, all items for the elements E *Content*, F *Process*, and G *Flexible grouping* were retained except F57 that was deleted due to having no significant relationship between the item and the total means of component 3 *Maintaining and protecting motivation.* Item F57 was omitted from component 3.

Table-5. Item Correlations with Total Means of Component 3 *Maintaining and protecting motivation*

Component 3	Elements	Items	Correlation coefficient (Pearson)	Results	Items	Correlation coefficient (Pearson)	Results
Maintaining and protecting motivation	E) Content	E41	.388**	Retained	E45	.760**	Retained
		E42	.438**	Retained	E46	.656**	Retained
		E43	.615**	Retained	E47	.744**	Retained
		E44	.652**	Retained	E48	.523**	Retained
	F) Process	F49	.561**	Retained	F54	.628**	Retained
		F50	.656**	Retained	F55	.624**	Retained
		F51	.526**	Retained	F56	.558**	Retained
		F52	.539**	Retained	F57	.120	deleted
		F53	.579**	Retained			
	G) Flexible grouping	G58	.553**	Retained	G62	.421**	Retained
		G59	.571**	Retained	G63	.465**	Retained
		G60	.460**	Retained	G64	.478**	Retained
		G61	.483**	Retained	G65	.304**	Retained

**p<0.01

4.2.5. Item Correlation with Total Means of Component 4: *Encouraging Positive Self-Evaluation*

The Pearson's correlation analysis between items and total means of component 4 *Encouraging positive self-evaluation* is shown in Table 6 below.

The analysis revealed significant relationships between all items and total means of component 4 *Encouraging positive self-evaluation*. The results of the Pearson's correlation coefficient between the items for the elements H *Product* and I *Ongoing assessment/adjustment* indicate a range of moderate to very high levels of significance, ranging from 0.368 – 0.706, p<0.01) and 0.454 – 0.648, p<0.01, respectively. Thus, all items for the elements H *Product* and I *Ongoing assessment/adjustment* were retained.

Table-6. Item Correlations with Total Means of Component 4 *Encouraging positive self-evaluation*

Component 4	Elements	Items	Correlation coefficient (Pearson)	Results	Items	Correlation coefficient (Pearson)	Results
Encouraging positive self-evaluation	H) Product	H66	.706**	Kekal	H69	.510**	Kekal
		H67	.688**	Kekal	H70	.569**	Kekal
		H68	.368**	Kekal	H71	.597**	Kekal
	I)On-going assessment /adjustment	I72	.590**	Kekal	I76	.511**	Kekal
		I73	.625**	Kekal	I77	.600**	Kekal
		I74	.551**	Kekal	I78	.454**	Kekal
		I75	.648**	Kekal			

**p<0.01

5. Construct Validity

5.1. Factor Analysis

Construct validity refers to the degree whether the items of an instrument measure what it is supposed to measure. A reliable instrument does not necessarily guarantee that it is valid, or that it measures particular constructs. In order to enhance the degree of validity of MoDiELT, Factor analysis was conducted on all of the items that, as mentioned before, were tentatively grouped into the nine elements of DI strategies and then classified according to the four L2 Motivational Teaching Components.

A factor refers to a list of items that belong together, while loading refers to association between an item and a factor (Bryman and Cramer, 2005; Parsian, 2009). Through factor analysis method, i) the items of an instrument are clustered into common factors, ii) factors are interpreted based on items with high loading, and then iii) the items are summarized into a small number of factors (Bryman and Cramer, 1999).

Factor analysis requires appropriate sample size in order to generate appropriate factors and loadings and thus reliable (Bryman and Cramer, 2005). In order to achieve a reliable factor analysis, i) Kaiser-Meyer-Olkin (KMO) sampling adequacy, and ii) factor loadings and correlation between a variable and a factor (Hayes, 2002), were employed.

After considering the appropriateness of sample size, as well as factor loadings and correlation between a variable and a factor, Principal Component Analysis (PCA) or Principal Axis Factoring (PAF) can be applied as the extraction method to analyze specific and common variance. While specific variance refers to the variation of a variable, common variance are the variance shared by the scores of respondents with other variables (Bryman and Cramer, 2005). Unlike PAF, PCA analyzes the total variance i.e. both specific and common variance, and deemed reliable without error (Bryman and Cramer, 2005). Therefore, in this study, PCA was employed on the 78 items of

MoDiELT. Only items with factorial weights at one factor are considered as genuine items, while items that fit in with two or more factors are considered complexed items (Tabachnick and Fidell, 2001).

The results of the factor analysis for all the components i.e. (1) *Creating the basic motivational condition*, (2) *Generating initial motivation*, (3) *Maintaining and protecting motivation* and (4) *Encouraging positive self-evaluation* are shown below.

5.2. Factor Analysis of Component 1: Creating the Basic Motivational Conditions (A, B) Using Principal Component Analysis and Varimax Rotations

Table-7. Factor Analysis of Component 1: Creating the basic motivational conditions (A, B) using Principal Component Analysis and Varimax Rotations

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.796
Bartlett's Test of Sphericity	Approx. Chi-Square	672.710
	df	105
	Sig.	.000

FACTOR ANALYSIS OF COMPONENT 1: Creating the basic motivational conditions (A, B) using Principal Component Analysis and Varimax Rotations		
	Factor	
	1	2
B8	.724	
B13	.720	
B10	.648	
B9	.640	
B11	.614	
B16	.531	
B12	.479	
B7	.460	
B14	.442	
B19	.412	
A4		.721
A6		.680
A3		.645
A2		.605
A5		.531
Eigen Value	3.498	2.477
Variance (%)	23.318	16.516
Cumulative (%)	23.318	39.833
N=180		
	B	A
Subdomain names	Readiness: Teacher bases lesson on learner readiness	Interest: Teacher establishes learner interest in lesson

Table 7 above displays the result of factor analysis for Component 1 *Creating the basic motivational conditions* with factorial weights and variance contribution towards each factor.

The percentage of variance contributed by the first and second factor are 23.318%, and 16.516% respectively. Both factors contributed to 39.833% of total variance in the original matrix. [After scrutinizing the scree plot, and considering the hypothetical factors, the researcher labeled [A] Interest: Teacher establishes learner interest in lesson, as the first factor and [B] Readiness: Teacher bases lesson on learner interest as the second factor. There is no changes in the items of each subdomain, as in the original classification. Four items were deleted i.e. A1, B15, B17 and B18 because they did not fit the subdomains.

5.3. Factor Analysis of Component 2: Generating Initial Motivation (C, D) Using Principal Component Analysis and Varimax Rotations

Table-8. Factor Analysis of Component 2: Generating initial motivation (G, H) using Principal Component Analysis and Varimax Rotations

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.820
Bartlett's Test of Sphericity	Approx. Chi-Square	1491.449
	df	210
	Sig.	.000

FACTOR ANALYSIS OF COMPONENT 2: Generating initial motivation (C, D) using Principal Component Analysis and Varimax Rotations		
	Factor	
	1	2
D31	.731	
C22	.696	
C21	.673	
D30	.650	
C20	.617	
C26	.603	
C23	.579	
D32	.572	
C29	.569	
C24	.557	
C27	.538	
C28	.537	
D33	.435	
D36		.808
D39		.714
D35		.607
D34		.606
D37		.606
D40		.596
D38		.453
C25		.381
Eigen Value	5.231	3.506
Variance (%)	24.911	16.695
Cumulative (%)	24.911	41.606
N=180		
	G	H
Nama subdomain	Learning profile: Teacher bases lesson on learning profile	Generic: choice, monitor, reward

Table 8 above displays the result of factor analysis for Component 2: *Generating initial motivation* with its factorial weights and variance contribution towards each factor. The percentage of variance contributed by the first and second factor are 24.911% and 16.695% respectively. Both factors contributed to 41.606% of total variance in the original matrix. [After scrutinizing the scree plot, and considering the hypothetical factors,] the researcher labeled [C] Learning profile: *Teacher bases lesson based on learning profile* as the first factor and [D] Generic: *choice, monitor, reward* as the second factor, even though items C25, D30, D31, D32, and D33 changed from the original classification. No items were dropped.

5.4. Factor Analysis for Component 3: Maintaining and Protecting Motivation (B, E, A) using Principal Component Analysis and Varimax Rotations

Table-9. Factor Analysis of Component 3: Maintaining and protecting motivation (E, F, G) using Principal Component Analysis and Varimax Rotations

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.757
Bartlett's Test of Sphericity	Approx. Chi-Square	1005.904
	df	190
	Sig.	.000

FACTOR ANALYSIS OF COMPONENT 3: Maintaining and protecting motivation (E, F, G) using Principal Component Analysis and Varimax Rotations			
	Factor		
	1	2	3
E47	.788		
E45	.767		
E46	.697		
E44	.577		
E48	.503		
E43	.449		
G59	.378		
F54		.681	
F50		.650	
F56		.628	
F49		.573	
F55		.532	
F51		.345	
G60			.692
G61			.671
F52			.512
E42			.499
F53			.446
G58			.373
G64			.353
Eigen Value	3.388	2.776	2.256
Variance (%)	16.941	13.882	11.281
Cumulative (%)	16.941	30.822	42.104
N=180			
	E	F	G
Nama subdomain	Content: Teacher varies the content based on the theme / topics	Process : Teacher varies the process	Flexible grouping: Teacher varies the group style

Table 9 above displays the result of factor analysis for Component 3: *Maintaining and protecting motivation* with its factorial weights and variance contribution towards each factor. The percentage of variance contributed by the first, second and third factors are 16.941%, 13.882% and 11.281% respectively. All the three factors contributed to 42.104% of total variance in the original matrix. [After scrutinizing the scree plot, and considering the hypothetical factors,] the researcher labeled [E] Content: *Teacher varies the content based on the theme* as the first factor, [F] Process: *Teacher varies the process as the second factor*, and [G] Flexible grouping: *Teacher varies the group style*, even though items G59, E42, F52 and F53 changed from the original classification. 5 items dropped were G62, G63, G65, E41 and F57 because the did not fit the subdomains.

5.5. Factor Analysis for Component 4 Encouraging Positive Self-Evaluation Using Principal Component Analysis and Varimax Rotations

Table-10. Factor Analysis For Component 4 Encouraging positive self-evaluation Using Principal Component Analysis and Varimax Rotations

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.784
Bartlett's Test of Sphericity	Approx. Chi-Square	398.213
	df	66
	Sig.	.000

FACTOR ANALYSIS FOR COMPONENT 4 Encouraging positive self-evaluation Using Principal Component Analysis and Varimax Rotations		
	Factor	
	1	2
I73	.765	
D29	.744	
I74	.542	
D28	.522	
I77	.503	
I78	.429	
I76		.651
D26		.642
D25		.558
D27		.528
D23		.476
D24		.452
Eigen Value	2.392	2.369
Variance (%)	19.930	19.739
Cumulative (%)	19.930	39.670
N=180		
	H	I
Nama subdomain	Product: Teacher varies the product	On-going assessment / adjustment: Teacher provides on-going assessment / adjustment

Table 10 above reveals the result of factor analysis for Component 4: *Encouraging positive self-evaluation* with its factorial weights and variance contribution towards each factor. The percentage of variance contributed by the first and second factors are 19.930% dan 19.739%. respectively. Both factors contributed to 39.670% of total variance in the original matrix. [After scrutinizing the scree plot, and considering the hypothetical factors,] the researcher labeled [H] Product: *teacher varies the product* as the first factor, and [I] On-going assessment/adjustment as the second factor even though items I75, I78 and H69 changed from the original classification. One item was dropped i.e. H68 because it did not fit the subdomains.

6. The Instrument for the Main Study

The finalized instrument for the main study was prepared based on the results of the reliability and validity analyses through several measures discussed above i.e. evaluating the face and content validity, as well as internal consistency and factor analyses. The new item total for the instrument is 68 items. The number of items for each element of DI strategies are displayed in Table 11 below.

Table-11. Final Number of Items on MoDiELT

Dornyei's L2 Motivational Teaching Components		Elements of DI Strategies guided by Tomlinson's Model of DI		Items	Number of Items
1	Creating the basic motivational conditions	A	Interest	A2, A3, A4, A5, A6	5
		B	Readiness	B7, B8, B9, B10, B11, B12, B13, B14, B16, B19	10
2	Generating initial motivation	C	Learning profile	C20, C21, C22, C23, C24, C26, C27, C28, C29, D30, D31, D32, D33	13
		D	Generic: choice, monitor, reward	C25, D34, D35, D36, D37, D38, D39, D40	8
3	Maintaining and protecting motivation	E	Content	G59, E43, E44, E45, E46, E47, E48	7
		F	Process	F49, F50, F51, F54, F55, F56	6
		G	Flexible Grouping	G58, G60, G61, G64, E42, F52, F53	7
4	Encouraging positive self-evaluation	H	Product	I77, I78, H66, H67, H70, H71	6
		I	Ongoing Assessment/Adjustment	I72, I73, I74, I75, I76, H69	6
Total number of items					68

6.1. Reliability of the Final 68-Item Instrument for the Main Study

The last step in refining the instrument is analyzing the internal consistency and correlation coefficience of the final 68 items. The result of this final reliability analysis on the 68 items are shown in Table 12 and 13 below.

Table-12. Reliability of MoDiELT with 68 items

Components of L2 Motivational Teaching	DI Strategies	Number of items	Reliability coefficience
1. Creating the basic motivational conditions	A) Interest: Teacher establishes learner interest in lesson	5	0.679
	B) Readiness: Teacher bases lesson on learner readiness	10	0.793
	Sub-total	15	0.817
2. Generating initial motivation	C) Learning profile: Teacher bases lesson on learning profile	13	0.864
	D) Generic: choice, monitor, reward	8	0.788
	Sub-total	21	0.881
3. Maintaining and proctecting motivation	E) Content: Teacher varies the content based on the theme / topics	7	0.764
	F) Process: Teacher varies the process	6	0.708
	G) Flexible grouping: Teacher varies the group style	7	0.628
	Sub-total	20	0.830
4. Encouraging positive self-evaluation	H) Product: Teacher varies the product	6	0.694
	I) On-going assessment / adjustment: Teacher provides on-going assessment / adjustment	6	0.640
	Sub-total	12	0.762
	Overall (A, B, C, D, E, F, G, H, I)	68	0.944

Table 12 above reveals that the internal consistency of each element of DI strategies (A-I) based on the Cronbachs alpha values, ranges from 0.628 – 0.864. The overall alpha values for each component are 0.817 (15 items), 0.881 (21 items), 0.830 (20 items) and 0.762 (12 items) respectively. Thus, the alpha values revealed in the table above indicate that the instrument has a high degree of reliability. Table 13 shows the overall means of each element of DI strategies ranging from 0.571 – 0.790 i.e. from high to very high, at significance value of $p<0.01$. In general, the result reveals that the items have high correlation as indicated by the overall means of each element of DI strategies.

Table-13. Correlation Coefficience of elements of DI strategies with the Overall Means

Components of L2 Motivational Teaching	DI Strategies	Overall Means	Strength
1. Creating the basic motivational conditions	A) Interest: Teacher establishes learner interest in lesson	.747**	Very High
	B) Readiness: Teacher bases lesson on learner readiness	.758**	Very High
2. Generating initial motivation	C) Learning profile: Teacher bases lesson on learning profile	.797**	Very High
	D) Generic: choice, monitor, reward	.710**	Very High
3. Maintaining and proctecting motivation	E) Content: Teacher varies the content based on the theme / topics	.731**	Very High
	F) Process: Teacher varies the process	.790**	Very High
	G) Flexible grouping: Teacher varies the group style	.571**	High
4. Encouraging positive self-evaluation	H) Product: Teacher varies the product	.731**	Very High
	I) On-going assessment / adjustment: Teacher provides on-going assessment / adjustment	.742**	Very High

**p<0.01

7. Conclusion

In this article, the researcher presented and discussed the reliability and validity measures that had been conducted with the purpose to refine an instrument called *Motivational Orientation towards Differentiated Instruction in English Language Teaching* (MoDiELT) meant to measure student motivation toward the use of differentiated instruction strategies in English language teaching, and reveal teachers' overall teaching performance i.r. their ability in differentiating lessons. The initial 78 items constructed for the draft of MoDiELT, were constructed based on nine elements of differentiated instruction strategies and four L2 Motivational Teaching components. The reliability and validity measures employed i.e. evaluating the face and content validity, internal consistency, and factor analysis resulted with ten items being deleted from the instrument. The overall analyses therefore suggest that the final 68-item MoDiELT, having high degree of overall reliability and validity, is reliable and valid to measure student motivation toward the use of differentiated instruction in English language teaching.

The focus of this discussion, thus, is the potential use of internal consistency and factor analyses in determining the reliability and validity of a research instrument. These analyses are consistent and stable indicators in justifying the reliability and validity of the items on an instrument. Nonetheless, more studies replicating the procedures discussed here would further enhance the reliability and validity of the instrument. In this regard, the researcher believes that the data gathered through MoDiELT would provide beneficial information not only for teachers to plan their lessons, but also for curriculum designers, in the teaching and learning of English language especially in Malaysian schools context. (Teachers, educators, or researchers may email the main author for the MoDiELT questionnaire for research and training purposes).

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Appendix 1

List of Final Items Constructed for MoDiELT

1. Creating the basic motivational conditions	**A. Interest: Teacher establishes learner interest in lesson**	
	A1	I am always able to relate what I'm doing in the classroom with my experience.
	A2	I like sharing with the class about my experience pertaining to certain issues/topics of discussion.
	A3	My teacher gives a variety of interesting tasks or activities for me to work on.
	A4	*I enjoy my English lessons this semester because what we do is neither too hard nor too easy.*
	A5	*In English lessons this semester, we are learning things that will be useful in the future.*
	B. Readiness: Teacher bases lesson on learner readiness	
	B6	I like working with the tasks or activities provided for English lesson.
	B7	I always get to choose what I want to do during English lessons.
	B8	I am always in time to hand in my assignments.
	B9	The English lesson this semester is challenging but doable.
	B10	I always have the opportunity to work on my own during English lesson.
	B11	When someone who is talking about something, I often feel I can explain better.
	B12	I feel I am making progress in English this semester.
	B13	I believe I will receive good grades in English this semester.
	B14	In English lessons this semester, I usually understand what to do and how to do it.
	B15	I feel more nervous in English class this semester than in my other classes.
2. Generating initial motivation	**C. Learning profile: Teacher bases lesson on learning profile**	
	C16	I do a lot of interesting activities during English lesson.
	C17	English language activities in the classroom are fun
	C18	In my English lesson, I always have the chance to give my ideas.
	C19	My teacher is encouraging/supportive.
	C20	By the end of the semester, I think my English will be better.
	C21	I think I have started to use English language with other people more often.
	C22	I feel I am more inquisitive and talkative now.
	C23	I often wish that the English period to be longer.
	C24	*I often volunteer to do speaking presentations in English lessons.*
	C25	I like English lesson because I can do whatever I want.
	C26	I like English lesson because I can suggest tasks or activities.
	C27	I have ample resources to refer to during the English lesson.
	C28	I always get to work outside of the classroom with my group members.
	D. Teacher allows choice, teacher monitors, teacher rewards	
	D29	I like when we are able to use multimedia applications and the Internet during English lessons.
	D30	I like when my teacher helps me from time to time during the activity.
	D31	I often wish that my teacher saw me completing the activities in the classroom.
	D32	I am honored when my teacher compliments my work.
	D33	I am excited to get the gifts from my teacher.
	D34	I often experience a feeling of success in my English lessons this semester.
	D35	I am sure that one day I will be able to speak English.
	D36	This semester, I think I am good at learning English.

3. Maintaining and protecting motivation	**E. Content: Teacher varies the content based on theme/ topics**	
	E37	I like the different tasks/assignments provided in the different groups.
	E38	I like the topics for discussion.
	E39	*I wish we had more English lessons at school this semester.*
	E40	*I like English lessons this semester.*
	E41	*English is one of my favorite subjects at school this semester.*
	E42	*When the English lesson ends, I often wish it could continue.*
	E43	*I want to work hard in English lessons to make my teacher happy.*
	F. Process: Teacher varies the process	
	F44	I am excited when my teacher asks questions.
	F45	I like to work on the questions posed by my teacher and friends.
	F46	I enjoy working with my friends in completing the tasks or activities.
	F47	I like doing presentation/performance with my group members.
	F48	In English lesson this semester, I enjoy exploring various topics.
	F49	I like when teacher allows me to do research on topics that I prefer.
	G. Flexible grouping: Teacher varies the grouping style	
	G50	I gain more ideas or information from my group members.
	G51	I like to co-operate/work with my friends through out English lesson.
	G52	I am excited to discuss the topic with my group members.
	G53	I prefer the flexible grouping style provided by my teacher.
	G54	I like when my teacher groups me according to my preference.
	G55	I prefer to choose my own group members.
	G56	I prefer to work with more students in my group.

4. Encouraging positive self-evaluation	**H. Product: Teacher varies the product**	
	H57	I am always excited for the next tests.
	H58	I feel excited when my teacher announces a pop-quiz.
	H59	I like English lesson because I can choose the tasks [i.e. writing, presentation, etc.]
	H60	I enjoy doing the tasks provided by my teacher.
	H61	I prefer to demonstrate what I have done through presentation.
	H62	*I get very worried if I make mistakes during English lessons this semester.*
	I. On-going assessment/ adjustment: Teacher provides on-going assessment/ adjustment	
	I63	I like the tests my teacher conducts from time to time.
	I64	I gain better marks in my work.
	I65	I am able to improve my assignments or projects.
	I66	I am confident with my work on the tests, assignments or work given.
	I67	My teacher allows ample time for assignments or projects given.
	I68	I prefer to show my work in writing.