



A Confirmatory Factor Analysis of Interpersonal Teacher Behaviour Scale: Validation of the Urdu Translation of Secondary School Students' Perspectives

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ABSTRACT

The interpersonal teacher behavior' model has been used in various countries. The validity of this instrument has been shown in different languages except in Pakistan. Therefore, this study aimed to validate students' perceptions of teachers' classroom interaction (QTI) in the Urdu version. To attain the purpose of the current investigation the secondary school students in Pakistan were taken as a sample, out of which 52% were boys and 48% girls. The Urdu translation of the QTI was used to accumulate the data. The Confirmatory factor analysis has been run to calculate the accuracy of the QTI structural model. Results confirm the fitness of the QTI structural model and support that Urdu translation of the QTI also applies to Pakistani secondary school students.

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1. Introduction

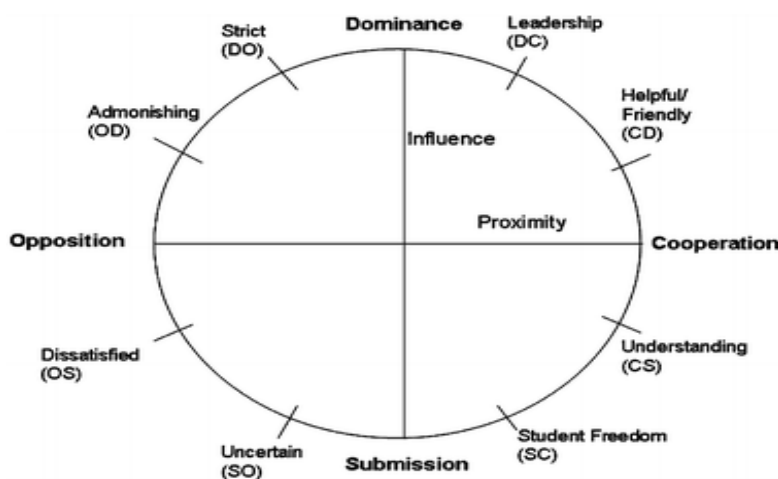
The Interpersonal Teacher Behavior Model (also known as MITB) offers a broader and hailed framework to study the interactions between students and teachers. Conversely, the instruments, that are designed to evaluate MITB in an educational context, are based on the weak properties of psychometric. MITB initially developed to point out the need for examined cross-cultural adaption methods. This piece of study aims to examine the cross-culture empirical verification of MITB within the secondary school educational context in Pakistan. The observed results of the current investigation will support the validity of the MITB.

The literature is full of longstanding efforts to probe out the interactions of teachers and students within the domain of the classroom, mainly by Chavez and David in 1984 and 2003 respectively. In 1985, Wubbels developed the Model of Interpersonal Teacher Behavior (MITB) after inspiring by the general interpersonal relations model of Leary presented in 1957. The general interpersonal relations provided a map about students' perceptions of the interpersonal behavior of their teachers. Since the emergence of MITB, it received international and national attention and recognition. It was because of the extensive application of the instrument that is designed for measuring the behavior of the MITB within the classrooms. This extensive instrument is called "Questionnaire on Teacher Interaction" also known as QTI according to Fraser and Walberg in 2005.

Although MTIB and QTI are widely used in different educational domains but translated versions of QTI possess weak psychometric properties along with some inability and shortcomings to depict the circumflex configuration of MITB. Therefore, such findings might be revealed the incompetency regarding the procedures applied in the validation of MITB in a cross-cultural context. The procedural investigations of the S-T (Teacher-student) interactions within classrooms had followed many different paradigms and empirical methodologies including qualitative and quantitative according to Lewin et al. in 1939, Withall, in 1949, Amidon & Hough, in 1967, Chavez, in 1984, Pianta in 1999, and Davis in 2003.

During 1985, Wubbels et al. provided a fertile concept of S-T interactions by considering it as a means of the communication process. Within the framework domain, Wubbles developed a basic model after inspiring by the general interpersonal relations model of Leary presented in 1957 represented as a circle of two intersecting dimensions. Wubbles categorized the first dimension of Influence as Dominance and Submission, whereas the other dimension of Proximity with Opposition and Cooperation. Dominance and submission are representing the control over the communication process and hostility and affection representing the degree of cooperation as a resultant of communicators. In figure 1, A schematic representation of the MITB is given.

Figure 1: Two-Dimensional Coordinate System of the Leary Model



From the combination of four distinct poles, the MITB comprises an emergence of eight indicators of behaviors. Leadership is the first pole of behavior along with Helping/friendly behavior and understanding. The fourth and fifth poles are student's responsibility or freedom and uncertain. Dissatisfied behavior, Admonishing and strict behavior are the last three poles of

attitudes of MITB. The MITB is a base for the QTI development, being an instrument that measures the perceptions of teachers' interpersonal behavior according to Wubbles et al. in 1985. Out of all eight scales of behavior with respect to communication style with teachers. This technique captured international attention and recognition and translated into 15 and more languages (Fraser & Walberg, 2005; Wubbels & Brekelmans, 2005).

Adaptation of QTI in the context of elementary schools, the eight indicators of behavior are consistently testified as challenging and problematic so far. The quantitative studies had been reviewed and revealed the fulfillment of basic expectations of the model under study (Goh & Fraser, 1996 & 1998; Koul, & Fisher, 2004; Scott & Fisher, 2004; den Brok, Fisher et al., 2005; Kyriakides, 2005; Kokkinos et al., 2009). Precisely, head-to-head scale cases showed a high degree of correlation in the same direction whereas absolutely opposite scales showing high negative correlation coefficient values. Several patterns emerged with specific behavior groups in such a way that the resultant patterns were failed to justify and explain the quantitative nature of aforesaid studies. There were various studies based on the classic methodology of MTIB in the different contexts of education, and among all, there is of Telli et al. version developed in 2007 that is a Turkish version of QTI. The research design developed by Telli et al included interviews base study from teachers and students and these results indicating some teacher behaviors that were a part of the original MTIB. In the discussion of the outcomes of the study, the researchers concluded as scales can be appeared as reliable if only translation and back-translation used, but unable to compare with Dutch and American translations. (Wubbels, & Levy, 1991). This piece of study aims to examine the cross-culture empirical verification of MITB within the secondary school educational context in Pakistan.

2. Variables

The empirical results of the study will support the validity of the MITB. Specifically, to make plausible statements about the validity of MITB. There is a need for evidence for the existence of all eight interpersonal behaviors of teachers within the Urdu context and place eight scales in the classrooms in a circumflex similar to MITB along with the setup of a map of potential deviations within original descriptions. The major concern or objective of this study is to define the quality of translation of the QTI in Urdu. The QTI comprises of 48 statements with 8 subscales. Every subscale has six items. Factors of the QTI are explained by Chiew, (1994) as follows:

2.1 Leadership (DC)

It is measurement of degree by which the teacher delivers leadership to class and grasps the concentration of the students.

2.2 Helping/Friendly (CD)

It is measurement of the degree by which any teacher is behaving favorably and looks to be accommodating towards pupils.

2.3 Understanding (CS)

It is measurement of the degree that shows how a teacher understands to students and having concerns and cares.

2.4 Student Responsibility/ Freedom (SC)

It is measurement of the degree that pupils are provided possibilities and obligations to

consider the sense of accountability towards their own actions.

2.5 Uncertain (SO)

It measures the degree that the teachers try to unveil his/her uncertainty.

2.6 Dissatisfied (OS)

It measures the degree that teacher expresses Unhappiness and dissatisfaction with students.

2.7 Admonishing (OD)

It measures the degree that is showing how teacher spectacle his/her anger, temper or impatience in class.

2.8 Strict (DO)

It measures the degree that reflects how teacher is strict with their students and their demanding.

3. Research Method

The quantitative analysis approach has been used to meet the goals of the current investigation. "Confirmatory factor analysis" CFA has been performed in Amos for testing the practicability of the proposed four dimensions under 8 sub- factors. The purposive sampling method has been used to treat the sample. Overall average age of the chosen students was between 13-17 years in girls and 15 to 19 years in boys. The following considerations were considered when choosing the respondents;

- Only those school of Government and private schools were approached where same curricula were thought.
- The students studying in 9th and 10th classes were approached and invited to take part in the study.
- Permission, along with consent, was also obtained from contestants former to the collection of data including information of the study aims, the data collection technique and its process.

Respondents were acquainted with the potential usefulness of data along with their confidentiality. Collected data has been filmed in the SPSS-AMOS. "Confirmatory factor analysis" was run to estimate the suitability of the structural model. The value of composite reliability, Cronbach alpha, and rho_A was also found to check the consistency of results. Average Variance Extracted (AVE) and discriminate validity were also found to check the accuracy of results.

4. Findings

4.1 Descriptive Statistics

The above table 1 presents demographics illustration about the sample. Table 1 depicts statistics relating to city, residence, gender, institution, class, and about the subject. From 1800 sample, 1780 returned the filled questionnaire with a response rate of 98%. City wise presentation of the respondent was: 26.7% belongs to Bahawalpur, 13.5% Sargodha, 21% Islamabad 13.4% Gujranwala, and 25.5% Lahore whereas, the area-wise distribution of the sample was the second demographic in which 71.4% of respondents were from an urban area and 28.6% were from the rural area of Punjab. There were 52% of boys', and 48% of girls participate

in the study. In all respondents of the study, 58.8% belong to class 9th and 41.1% from the 10th. Institution wise representation of the sample remains 75.6% belong to the government sector and 24.4% from the private institutions. Subject wise representation of the respondents was: Science (30.2%), Arts (28.9%), and compulsory subjects (40.9 %).

Table 1: Demographics of Sample

Demographics	F	%	Graph										
1- City													
Bahawalpur	474	26.7	<table border="1"> <tr><td>LAHORE</td><td>25.5</td></tr> <tr><td>GUJRAWALA</td><td>13.4</td></tr> <tr><td>ISLAMABAD</td><td>21</td></tr> <tr><td>SARGODHA</td><td>13.5</td></tr> <tr><td>BAHAWALPUR</td><td>26.7</td></tr> </table>	LAHORE	25.5	GUJRAWALA	13.4	ISLAMABAD	21	SARGODHA	13.5	BAHAWALPUR	26.7
LAHORE	25.5												
GUJRAWALA	13.4												
ISLAMABAD	21												
SARGODHA	13.5												
BAHAWALPUR	26.7												
Sargodha	240	13.5											
Islamabad	372	21											
Gujranwala	239	13.4											
Lahore	445	25.5											
2- Residence													
Urban	1271	71.4	<table border="1"> <tr><td>RURAL</td><td>28.6</td></tr> <tr><td>URBAN</td><td>71.4</td></tr> </table>	RURAL	28.6	URBAN	71.4						
RURAL	28.6												
URBAN	71.4												
Rural	509	28.6											
3- Gender													
Male	925	52	<table border="1"> <tr><td>FEMALE</td><td>48</td></tr> <tr><td>MALE</td><td>52</td></tr> </table>	FEMALE	48	MALE	52						
FEMALE	48												
MALE	52												
Female	855	48											
4-Institution													
Government	1345	75.6	<table border="1"> <tr><td>PRIVATE</td><td>24.4</td></tr> <tr><td>GOVERNMENT</td><td>75.6</td></tr> </table>	PRIVATE	24.4	GOVERNMENT	75.6						
PRIVATE	24.4												
GOVERNMENT	75.6												
Private	435	24.4											
5- Class													
9th	1047	58.8	<table border="1"> <tr><td>10TH</td><td>41.1</td></tr> <tr><td>9TH</td><td>58.8</td></tr> </table>	10TH	41.1	9TH	58.8						
10TH	41.1												
9TH	58.8												
10th	733	41.1											
6- Subjects													
Compulsory	728	40.9	<table border="1"> <tr><td>SCIENCE</td><td>30.2</td></tr> <tr><td>ARTS</td><td>28.9</td></tr> <tr><td>COMPULSORY</td><td>40.9</td></tr> </table>	SCIENCE	30.2	ARTS	28.9	COMPULSORY	40.9				
SCIENCE	30.2												
ARTS	28.9												
COMPULSORY	40.9												
Arts	514	28.9											
Science	538	30.2											

4.2 Validity

4.2.1 Convergent Validity (CV)

Convergent validity is connected to a high relationship among items within a particular factor, which is evident by factor loadings (Gaskin, 2016a; Urbach & Ahlemann, 2010); Lehmann, 1988). In 1981 Fornell and Larcker introduced two measures for assessing convergent validity, the first one is known as Average Variance Extracted (AVE), while the other one is values of factor loading/item inter reliability, ascertaining the importance of loadings which depends on the size of the sample. Furthermore, in 2016(b) Gaskin provided a threshold of significant loading along with their sample size. The factor loading of each item within its dimension is given in Table 2. All the loading on plagiaristic factors were above .50, which demonstrates the acceptable limit of convergent validity. If the value of AVE for a construct is greater than 0.5, then it will fall in the category of acceptance.

Table 2: Standardized regression weights / factor loadings on the sample

	DC(1-6)	CS(1-6)	OS(1-6)	OD(1-6)	CD(1-6)	DO(1-6)	SO(1-6)	SC(1-6)
DC-1	.644							
DC-2	.667							
DC-3	.614							
DC-4	.719							
DC-5	.673							
DC-6	.738							
CS-1		.711						
CS-2		.777						
CS-3		.755						
CS-4		.713						
CS-5		.724						
CS-6		.692						
OS-1			.774					
OS-2			.741					
OS-3			.870					
OS-4			.783					
OS-5			.866					
OS-6			.850					
OD-1				.722				
OD-2				.621				
OD-3				.883				
OD-4				.776				
OD-5				.788				
OD-6				.949				
CD-1					.645			
CD-2					.660			
CD-3					.711			
CD-4					.734			
CD-5					.590			
CD-6					.679			
DO-1						.753		
DO-2						.664		
DO-3						.694		
DO-4						.674		
DO-5						.740		
DO-6						.733		
SO-1							.731	
SO-2							.658	
SO-3							.719	
SO-4							.610	
SO-5							.811	
SO-6							.767	
SC-1								.601
SC-2								.753
SC-3								.751
SC-4								.699
SC-5								.814
SC-6								.794

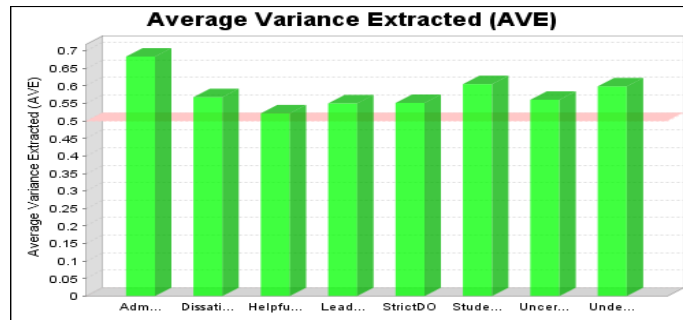
The above table illustrates that all the factors of QTI remain greater than 0.5 value, which shows adequate limit of convergent validity. The factor loadings of Leadership (DC) factor ranges from .614 to .738, Helping/Friendly factor ranges from (CD) .590 to .734, Understanding (CS)

factor ranges from .692 to .777, Student Responsibility/ Freedom (SC) factor ranges from .601 to .814, Uncertain (SO) .610 to .811, Dissatisfied (OS) factor ranges from .774 to .870, Admonishing (OD) factor ranges from .621 to .949, and Strict (DO) factor ranges from .664 to .753.

4.2.2 Average Variance Extracted

The value of Average Variance Extracted (AVE) was between 0.51 - 0.69, which was also acceptable. Values AVE against each factor of the scale are given in figure 2.

Figure 2 : AVE of QTI factors



The above figure illustrates that all the factors of QTI have greater than 0.5 value of AVE, which shows an acceptable degree for convergent validity. The AVE value of Admonishing (OD) remained (.675) highest in all QTI factors, whereas Helping/Friendly (CD) remained (.511) at the least level in AVE. Remaining factors of QTI were Leadership (DC) .556, Understanding (CS) .601, Student Responsibility/ Freedom (SC) .633, Uncertain (SO) .557, Dissatisfied (OS) .559, and Strict (DO) .552.

4.2.3 Discriminant Validity

Discriminant validity is specified about what degree factors are not associated with other factor items. It is essentially a principle that items should contribute more to their own component than to other factors. (Urbach & Ahlemann, 2010; Gaskin, 2016a). Discriminant validity verifies whether or not some construct is still evaluated by a criterion of a given construct. In 1998 Chin mentioned that discriminant validity can be assessed by examining the factor loading and the cross-loading of all indicators to their analogous latent variables(LVs). To achieve cross-loading, the value of separately construct is associated with all other measures. Discriminant Validity can be tested and assumed because the loading values of the indicator are higher against its calculated construct than for every other construct and each construct has the highest values of its given indicator. Discriminant validity against each factor of the scale are given in table 3.

Table 3: Discriminant validity of QTI

	Factors	1	2	3	4	5	6	7	8
1	OS	0.816							
2	CS	-0.393	0.710						
3	DC	-0.436	0.551	0.668					
4	SO	0.723	-0.341	-0.370	0.731				
5	SC	0.364	0.040	0.038	0.320	0.741			
6	CD	-0.045	0.534	0.407	-0.035	0.423	0.597		
7	DO	0.436	-0.055	0.013	0.385	0.361	0.174	0.681	
8	OD	0.347	0.260	0.128	0.377	0.539	0.484	0.481	0.698

In table 3, the values in the diagonals table are higher than the values in the parallel columns and rows. Discriminant validity further demonstrates that all the factors of QTI are highly unlinked with other factors.

4.3 Reliability

Reliability is an accuracy of measurement determined by the degree to which a test is consistent over time and will give comparable results when applied to the same group or individual on various events. *Internal Consistency Reliability is generally represented by Composite Reliability. In 1994, Nunnally and Bernstein depicted that for confirmatory research the values of CR must be greater than 0.8. However, less than 0.6 values imply a lack of ICR. Figure 2,3, and 4 gives the values of Cronbach alpha, composite reliability, and rho_A for the measurement model in this study.*

Figure 3: Values of Cronbach alpha

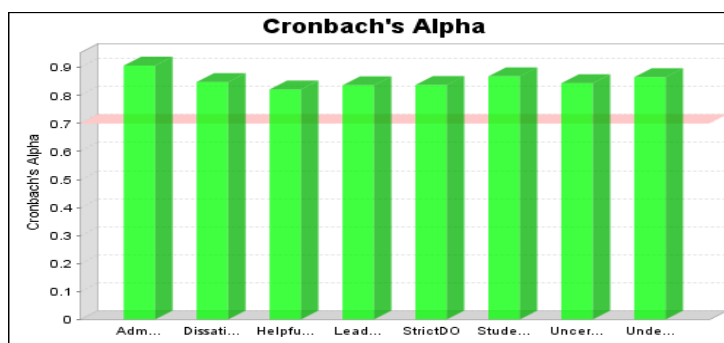


Figure 3 depict that the value of Cronbach alpha remained between 0.90 to 0.89 illustrates that reliability was significant. The Cronbach *alpha* value of Admonishing (OD) remained highest in all QTI factors, whereas Helping/Friendly (CD) remained at the least level in reliability of Cronbach alpha.

Figure 4: Values of composite reliability

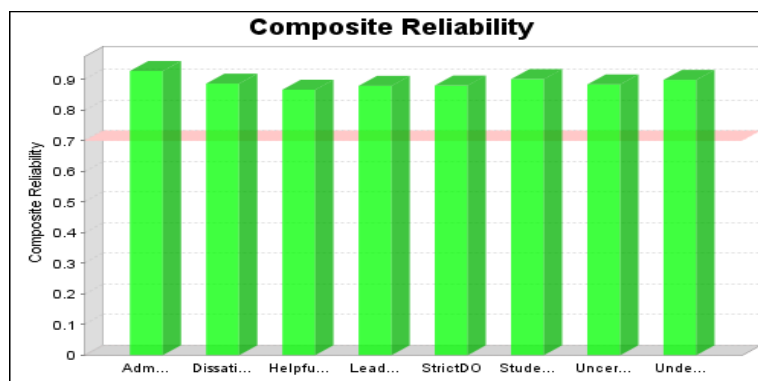
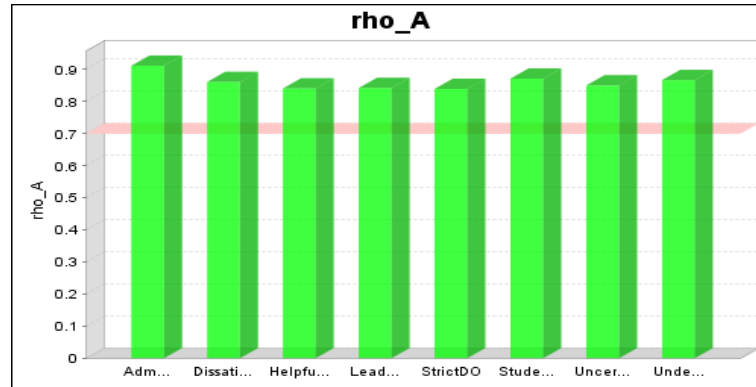


Figure 4 depict that the value of Composite Reliability between .90 to .88 shows that construct reliability was good and acceptable. The Composite Reliability value of Admonishing style of teacher remained highest in all QTI sub-factors, whereas Helping/Friendly (CD) remained at the least level in reliability of Composite Reliability. The values of composite reliability against each factor of the scale were significant.

Figure 5 depict that the value of rho_A between .91 to .85 shows that construct reliability was acceptable and significant. The rho_A value of Admonishing style of teacher remained highest in all QTI sub-factors, whereas Helping/Friendly (CD), Leadership and strict style of teachers remained at the least level in reliability of rho_A. The values of rho_A reliability against each factor of the scale were significant.

Figure 5: Values of rho_A



4.4 Goodness of Fit of QTI

Goodness of fit indices for the developed model of QTI are presented in Table 4. Model reflected absolute fitness by following the threshold specified by Hair et. al. (2010). Results demonstrated that the values of Absolute Fit Measures were good enough. The value of the Goodness of Fit Index remained .933 (threshold >.90), and the Root Mean Square Error of Approximation remained .059 (threshold <0.08) that was between the low and high 90% confidence interval.

Table 4: Basic statistics from CFA testing the fitness of the structural model of the QTI

Variables	(AFM)		(IFM)			(PFM)	
	GFI	RMSE	AGFI	CFI	IFI	PCFI	PNFI
Student	.933	0.059	.876	.955	.916	.783	.769

Note: Absolute Fit Measures (AFM), GFI=Goodness-of-Fit Index, RMSEA=Root Mean Square Error of Approximation, Incremental Fit Measures (IFM), AGFI=Adjusted Goodness-of-Fit Index, CFI=Comparative Fit Index, Parsimony Fit Measures (PFM)

Results verified that the values of Incremental Fit Measures were excellent and significant. Value of Adjusted Goodness-of-Fit Index remained .876 (threshold >0.80), Comparative Fit Index remained .955 (threshold >.90), and Incremental Fit Index remained .916. (threshold >.90). Results confirmed that the values of Parsimony Fit Measures were also significant. The value of the Parsimony Comparative Fit Index remained .783 (threshold >.50), and Parsimony Normed Fit Index remained .769 (threshold >.50). The values validate a suitable fitness of the model.

5. Conclusions

The current investigation validates the adequacy of the structural model of the QTI in the Punjab province of Pakistani. The QTI comprises 48 items long with 8 sub-factors. every sub factor consists on 6items. All statements confirm adequate factor loadings. Moreover, the fitness of the model including GFI, RMSE, AGFI, CFI, IFI, PCFI, and PNFI are admissible on secondary school students. The CFA results of the QTI explains that all factors and sub-factors contained adequate values of Cronbach alpha, composite reliability, and rho_A. Furthermore, values of AVE

are higher than 0.5, which highlights an acceptable degree for convergent validity. Discriminant validity is highly unlinked with other factors. *The value of Cronbach alpha, Composite Reliability between and rho_A confirms that reliability was appropriate and acceptable.* Hence, the results of CFA prove that the Urdu translation of the QTI is valid and acceptable in Pakistani secondary schools.

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