



Transition to Teaching Survey 2017 Validity and Reliability

An exploratory factor analysis was performed to test the validity and reliability of the Transition to Teaching Survey (TTS) data for Parts B, C, and D. The following sections were included: Part B “Your teacher preparation,” Part C “Your school context,” and Part D “Program recommendation.” Part A, “Your licensure and job status,” was not included in the analysis because the items do not provide scale level data. The data set used for this analysis included Network for Excellence in Teaching (NExT) and all affiliate institutions who contributed to the aggregate. An exploratory factor analysis informs decisions about retaining, revising, or eliminating survey items based on how well they contribute to the overall understanding of the construct.

The correlation, reliability matrix, and exploratory factor analysis were conducted using SAS 9.4, PROC CORR and PROC FACTOR procedures. Principal axis method with varimax rotation was used to identify the factors and evaluate the latent structure of the items for each part of the survey.

Prior to the factor analysis, assumptions including determinant, Kaiser-Mayer-Olkin (KMO), and Bartlett were tested. In addition, cross loadings were checked to identify variables that are poor factor indicators. A difference in cross loading of less than 0.1 was set as the threshold. The determinant suggests whether items are too close to run the analysis; KMO ensures enough survey items are predicted by each factor; the Bartlett tests whether the items have sufficient correlations to perform the factor analysis. All the assumption tests were conducted in R program.

Results Summary

Test of Assumptions

Assumptions of sampling adequacy (KMO) and normal distribution across samples (Bartlett’s Test) were both met for all parts of the TTS. However, the determinant was lower than ideal for Part B, which indicates potential problems with collinearity, indicating that some variables are highly correlated and are likely redundant. The test results were similar to the 2015 TTS data.

Part B: Your teacher preparation

Correlations were calculated to check how related the items are to each other. According to Cohen (1988), correlation coefficients between 0.3 and 0.49 suggest a moderate correlation between two variables. Coefficients from 0.1 to 0.29 indicate weak correlations, 0.30 to 0.49 indicate moderate correlations, while 0.5 to 1.0 are strong correlations. Based on this guideline, most of the bivariate correlations among items in Part B were moderate, ranging from weak (.242) to strong (.821), which indicates that these items are all closely related to one another. Item b4g_advo has very low correlations, ranging from 0.09 to .262, with all other items in Part B, which suggests that item b4g_advo is not closely related with any other items in Part B.

Part B contains four sections: Section B1, Instructional Practice; Section B2, Diverse Learners; Section B3, Learning Environment; and Section B4, Professionalism. All 46 items in Part B were included in this analysis.

Four factors retained in the factor analysis, in total accounting for 91% of the variance. The first factor accounted for 33% of the variance, the second factor accounted for 22%, the third accounted for 20%, and the fourth factor accounted for 16% of the variance. Table 1 delineates a list of items that loaded on each factor, the primary topic for each factor, and the percentage of the variance explained. Table 2 shows the factor loading matrix after rotation; items that loaded onto the same factor are circled together. Further discussion of each factor follows the two tables.

Table 1. Part B: Teacher Preparation Factors

Factor	Items	Primary Topic	Variance Explained
1	b1a_lic, b1b_strat, b1c_pers, b1d_prior, b1e_long, b1f_adjust, b1g_clear, b1h_mod, b1i_fdbk, b1j_self, b1k_assess, b1l_rel, b1m_lrnds, B1mm_diff, b1n_tech, b1o_tools, b1p_crit, b1q_cmplx, b1r_intdsc, b1s_glbl, b1t_concl	Instructional Practice	33%
2	b2a_dvrs, b2b_diff, b2c_dev, b2d_soc, b2e_iep, b2f_mntl, b2g_gift, b2h_ell, b2i_access	Diverse Learners	22%
3	b3a_expec, b3b_strat, b3c_real, b3d_work, b3e_prom, b3f_resp, b3g_diff, b3h_self, b3i_org	Learning Environment	20%
4	b4a_pd, b4b_lit, b4c_pare, b4d_coll, b4e_fdbk, b4f_legal, b4g_advo	Professionalism	16%

Section B1: Instructional Practice

All 18 items from Section B1, Instructional Practice, loaded onto Factor 1. All of these items related to instructional practice, which indicates that Section B1 represents one scale related to Instructional Practice. Additionally, there are no items cross-loaded with other factors.

Section B2: Diverse Learners

All items in Section B2 loaded highest onto Factor 2, indicating that Section B2 represents one scale related to diverse learners. In addition, there are no items cross-loaded with other factors in Section B2.

Section B3: Learning Environment

All items from Section B3 loaded strongly onto Factor 3, suggesting that these items represent one scale related to learning environment. However, item b4g_advo loads nearly as strongly on Factors 1 and 3 making it difficult to determine with certainty to which of the two factors (if either) this item belongs.

Section B4: Professionalism

All items in Section 4 loaded onto Factor 4, Professionalism, with one concern that the item

b4g_advo has a very low factor coefficient. Item b4g_advo has relatively low correlations with all other items, which suggests that this item should be revised or eliminated from the section. Overall, the factor analysis result suggests that all these items, except the item b4g_advo, can be used to measure one Professionalism scale for future analysis. No items cross-loaded onto other factors, indicating that these items make up one construct.

Table 2. Part B: Teacher Preparation Factor Loading Matrix

	Factor			
	1	2	3	4
b1b_strat	0.67			
b1c_pers	0.67			
b1o_tools	0.67			
b1d_prior	0.63			
b1k_assess	0.63			
b1p_crit	0.63			
b1j_self	0.63			
b1q_cmplx	0.61			
b1h_mod	0.61			
b1i_fdbk	0.61			
b1s_glbl	0.61			
b1n_tech	0.61			
b1m_lrnds	0.60			
b1l_rel	0.59			
b1g_clear	0.58			
b1e_long	0.58			
b1f_adjust	0.57			
b1r_intdsc	0.56			
B1mm_diff	0.54			
b1a_lic	0.52			
b1t_concl	0.52			
b2f_mntl		0.72		
b2d_soc		0.71		
b2e_iep		0.71		
b2c_dev		0.66		
b2i_access		0.66		
b2h_ell		0.65		
b2b_diff		0.63		
b2a_dvrs		0.61		
b2g_gift		0.60		

b3a_expec			0.74	
b3e_prom			0.74	
b3f_resp			0.73	
b3h_self			0.64	
b3b_strat	0.46		0.66	
b3i_org			0.62	
b3d_work	0.44		0.59	
b3g_diff			0.54	
b3c_real	0.46		0.53	
b4d_coll				0.81
b4e_fdbk				0.81
b4b_lit				0.73
b4a_pd				0.72
b4c_pare				0.70
b4f_legal				0.70
b4g_advo				

Note: Some low factor loadings (less than 0.4) were removed to aid the interpretation of this table.

Part C: Your school context

The intent of Part C is to measure School Context using items categorized by the following sub-constructs: (a) School Climate, (b) Professional Environment, and (c) Resources. In analyzing the data, the 11 items in Part C loaded on two factors, which were partially aligned with the intended sub-constructs. Sections C1 (School Climate) and C2 (Professional Environment) items loaded on one factor, suggesting they may create one School Environment construct. Items from C2 (Professional Environment) cross-loaded onto a factor with items from section C3 (Resources), indicating the wording or underlying construct of those items may not be specific enough for the respondents to make a distinction between the two constructs.

Exploratory factor analysis was completed for Part C, which contains three sections: C1, C2, and C3. All of the items in Part C: School Context were included in this analysis to determine if the constructs suggested by the sections were supported by the statistical analysis. Again, the correlations between the items were calculated to observe how well the items are related to each other. The correlation explanation use Cohen's (1988) guideline.

All items in Part C: School Context had moderate to strong bivariate correlations. The items from section C1 had moderate to strong bivariate correlations ranging from .468 to .699. Items from section C2 and section C3 had moderate to strong bivariate correlations between items of the same section ranging from .411 to .632 and .402 to .557, respectively. Moderate to strong correlations were found between all of the variables within each of the individual sections of Part C: School Context, indicating that these items are all closely related to one another. When items intended for separate constructs are closely related, it can be concluded that the constructs the items are measuring are also closely related. This result is similar with 2015 TTS data.

The two factors retained in the factor analysis accounted for 99% of the variance. Factor 1 accounted for 55% of the variance, and Factor 2 accounted for 44% of the variance. Table 3

shows the two factors and the lists of items that loaded on each factor, the primary topic of each factor, and the percentage of the variance explained. Table 4 shows the factor analysis results with circles indicating items' loadings on the two factors. Further discussion follows the two tables.

Table 3. Part C: School Context Factors

Factor	Items	Primary Topic	Variance Explained
1	c1a_safe, c1b_dig, c1c_pos, c2a_val, c2b_needs, c2c_seek, c2d_infl	School Environment	55%
2	c3a_sched, c3b_tech, c3c_space, c3d_supp	Resources	44%

Table 4. Part C: School Context Factor Loading Matrix

	Factor	
	1	2
c1c_pos	0.76	
c1b_dig	0.73	
c2c_seek	0.63	
c2b_needs	0.59	0.45
c2a_val	0.58	0.41
c1a_safe	0.54	
c2d_infl	0.49	
c3d_supp		0.70
c3b_tech		0.65
c3c_space		0.61
c3a_sched		0.58

Note: Some low factor loadings (less than 0.4) were removed to aid the interpretation of this table.

Section C1: School Climate

All Section C1 items loaded onto Factor 1, School Environment with all the items from section C2, which suggests that Section C1, School Climate, and Section C2, Professional Environment may not be distinct constructs. The two section items loaded onto one factor, indicating these items could be combined into one School Environment construct for further analysis.

Section C2: Professional Environment

All items in Section C2 loaded onto Factor 1, School Environment. However, items c2a_val and c2b_needs cross-loaded onto Factor 2, Resources, with the items from Section C3. While section C2 items relate to the school environment, new teachers may not have spent enough time in their respective schools to make accurate judgments about teachers school-wide. These results are similar to 2015 TTS data.

Section C3: Resources

All section C3 items loaded onto Factor 2, Resources, which also occurred in the 2015 TTS

analysis. The loading of all C3 items together suggests that these items represent one construct. In addition, no items in Section C3 cross loaded with Factor 1. These findings suggest items in section C3 represent one construct.

Part D: Program Recommendation

Based on Cohen’s (1988) guidelines, items in Part D exhibited a wide range of bivariate correlations, from 0.295 to 0.702, which indicates that the items were differentially correlated. Item d1a_rec and item d1d_prep are strongly correlated with each other, with the correlation coefficient 0.702; item d1b_happy and d1c_rwds are strongly correlated with one another, with the correlation coefficient 0.70. While, item d1a_rec had weak correlation with item d1b_happy with a very low coefficient 0.295; item d1b_happy and item d1d_prep had moderate correlation with the low coefficient 0.465. These findings suggested that Part D items would likely split into two factors.

The factor analysis shows that the 4 items in Part D loaded on two factors, which were related to the one intended construct. Each of the two factors consisted of two items. Each factor accounted for 49% of the variance, in total accounting for 98%. Table 5 shows the two factor loadings of Part D. The result from the factor analysis are included in Table 6 with circles indicating items’ loadings on the two factors.

Table 5. Part D: Program Recommendation Factors

Factor	Items	Primary Topic	Variance Explained
1	d1a_rec, d1d_prep	Teacher Preparation Program	49%
2	d1b_happy, d1c_rwds	Teaching Profession	49%

Table 6. Part D: Program Recommendation Factor Loading Matrix

	Factor	
	1	2
d1a_rec	0.73	
d1d_prep	0.73	
d1b_happy		0.72
d1c_rwds		0.72

Note: Some low factor loadings (less than 0.4) were removed to aid the interpretation of this table.

Instrument Reliability

The reliability of the scales suggested by the factor loadings was assessed using Cronbach's alpha. All reliability estimates are included in Table 7.

Table 7. Reliability Analysis

Part	Scale	Cronbach's Alpha
	Part B: Teacher Preparation—Overall	0.98
B	Instructional Practice	0.96
	Learning Environment	0.93
	Diverse Learners	0.94
	Professionalism	0.89
	Part C: School Context—Overall	0.89
C	School Environment	0.87
	Resources	0.80
	Part D: Program Recommendation—Overall	0.82
D	Teacher Preparation Program	0.82
	Teaching Profession	0.81

The alpha coefficients, all greater than .70, indicates good internal consistency for these constructs. If the alpha coefficient is higher than 0.9, some items might be repetitive and could be deleted. Similar as the 2015 TTS analysis results, the overall coefficient alpha in Part B, Preparation for Teaching, is 0.98, which is too high, indicating some repetitive items exist. The alpha reduced to .96 for the Instructional Practice suggesting that some selective deletions in this section may make the instrument less repetitive overall.

For Part C, School Context, and Part D, Program Recommendation, the overall alpha scores are 0.89 and 0.82, which indicates good internal consistency. For Part C, the alpha coefficient reduced into 0.87 and 0.80 for the two factors, suggesting elimination of repetitive items would likely strengthen the instrument. Not much difference was observed for the alpha coefficient in Part D, suggesting that these items measure two distinct constructs.

Conclusion

Part B: Teacher Preparation

Factor 3 items b3b_strat, b3d_work and b3c_real highly crossed loaded onto Factor 1, which indicates ambiguous loading onto either Factor 1 or Factor 3. They should be reworded or eliminated so that the items are more consistent in Factor 3. Even though the item b4g_advo loaded onto Factor 4, it had very low correlation with others. To enhance the consistency, it should be either removed or revised to fit Section 4.

Another option to enhance reliability and construct validity would be to increase the number of options in the response scale. More options in the response scale could have a positive impact on the factor loadings.

Part C: School Context

The items in C1 (School Climate) and C2 (Professional Environment) could be grouped together

and more clearly defined as one construct. Alternatively, items in sections C1 and C2 could be revised to be more conceptually different enough for respondents to distinguish between them.

Part D: Program Recommendation

Despite the items designed as one section, the factor loading, correlation matrix, and percent of variance accounted for clearly indicate two factors, suggesting these items could potentially make two distinct scales.

Note: If items are revised, additional factor analysis should be conducted to determine if factor loadings change as a result of any revisions.

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