

TIMSS 2011

The TIMSS 2011 Instruction Affected by Mathematics Resource Shortages Scale, Eighth Grade

The Instruction Affected by Mathematics Resource Shortages (MRS) scale was created based on principals' responses concerning twelve school and classroom resources described below. See [Creating and Interpreting TIMSS and PIRLS 2011 Context Questionnaire Scales](#) for more information on how the scales were formed.

Exhibit 1: Items in the TIMSS 2011 Instruction Affected by Mathematics Resource Shortages Scale, Eighth Grade

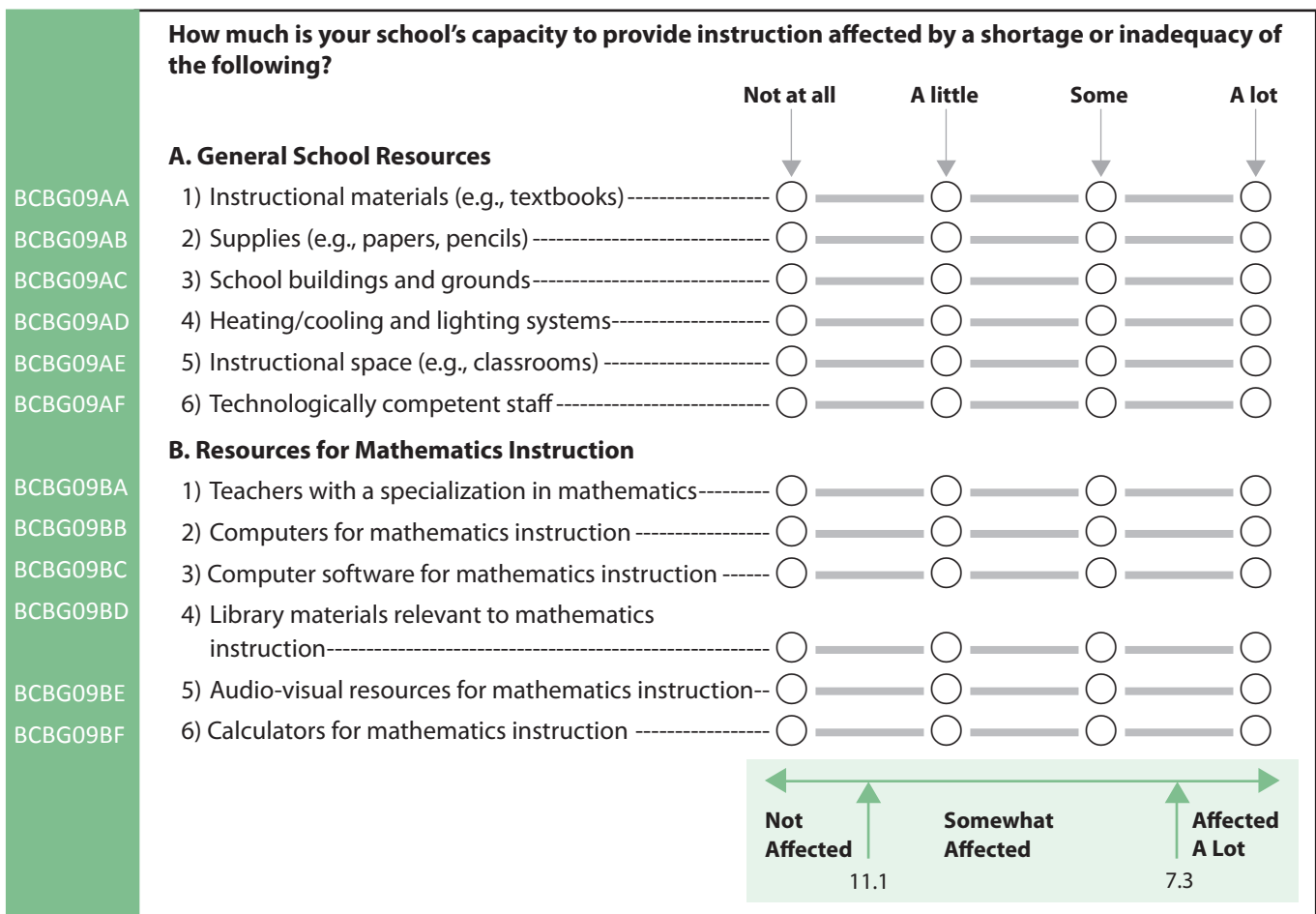


Exhibit 2: Item Parameters for the TIMSS 2011 Instruction Affected by Mathematics Resource Shortages Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3
BCBG09AA	-0.38921	-0.13678	-0.00548	0.14226
BCBG09AB	-0.65064	-0.14124	0.17671	-0.03547
BCBG09AC	-0.30390	-0.63826	0.16382	0.47444
BCBG09AD	-0.56578	-0.54220	0.11589	0.42631
BCBG09AE	-0.18500	-0.26462	-0.06612	0.33074
BCBG09AF	-0.43468	-0.94424	-0.00329	0.94753
BCBG09BA	-0.36430	0.33691	-0.04306	-0.29385
BCBG09BB	-0.53162	-0.83508	0.10916	0.72592
BCBG09BC	-0.42380	-1.12339	0.11050	1.01289
BCBG09BD	-0.52808	-1.12275	0.05291	1.06984
BCBG09BE	-0.44186	-1.03244	-0.03739	1.06983
BCBG09BF	-0.83677	-0.43890	0.08443	0.35447

Exhibit 3: Scale Transformation Constants

Scale Transformation Constants

A = 9.95503

B = 1.58557

Transformed Scale Score = 9.95503 + 1.58557 • Logit Scale Score

Exhibit 4: Equivalence Table of the Raw Score and the Transformed Scale Score

Raw Score	Transformed Scale Score	Cutpoint	Raw Score	Transformed Scale Score	Cutpoint
0	3.08516		19	9.35517	
1	4.85143		20	9.48502	
2	5.68200		21	9.61802	
3	6.23346		22	9.75180	
4	6.64807		23	9.88987	
5	6.98140		24	10.03373	
6	7.26137	7.3	25	10.18510	
7	7.50398		26	10.34604	
8	7.71806		27	10.51899	
9	7.91161		28	10.70584	
10	8.08902		29	10.91347	
11	8.25383		30	11.14758	11.1
12	8.40871		31	11.41784	
13	8.55578		32	11.73944	
14	8.69677		33	12.14035	
15	8.83312		34	12.67527	
16	8.96605		35	13.48636	
17	9.09669		36	15.22949	
18	9.22607				

Exhibit 5: Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2011 Instruction Affected by Mathematics Resource Shortages Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Factor Loadings for Each Item											
			BCBG09AA	BCBG09AB	BCBG09AC	BCBG09AD	BCBG09AE	BCBG09AF	BCBG09BA	BCBG09BB	BCBG09BC	BCBG09BD	BCBG09BE	BCBG09BF
Armenia	0.83	35	0.52	0.62	0.57	0.61	0.73	0.63	0.50	0.59	0.59	0.69	0.55	0.49
Australia	0.91	50	0.72	0.75	0.61	0.64	0.64	0.69	0.65	0.72	0.74	0.75	0.80	0.73
Bahrain	0.89	49	0.91	0.89	0.83	0.91	0.91	0.78	0.88	0.41	0.07	0.29	0.15	0.52
Chile	0.90	49	0.70	0.74	0.64	0.60	0.65	0.74	0.74	0.78	0.64	0.73	0.74	0.66
Chinese Taipei	0.91	51	0.67	0.72	0.70	0.77	0.71	0.76	0.67	0.72	0.74	0.74	0.70	0.59
England	0.90	50	0.77	0.62	0.72	0.72	0.66	0.65	0.41	0.74	0.83	0.78	0.84	0.66
Finland	0.86	41	0.73	0.68	0.71	0.64	0.75	0.57	0.64	0.60	0.58	0.50	0.62	0.62
Georgia	0.85	39	0.64	0.63	0.56	0.60	0.57	0.59	0.58	0.71	0.72	0.68	0.66	0.45
Ghana	0.79	38	0.03	0.13	-0.10	0.41	-0.25	0.18	0.31	0.95	0.95	0.88	0.93	0.87
Hong Kong SAR	0.94	61	0.78	0.79	0.74	0.81	0.75	0.79	0.77	0.85	0.69	0.81	0.70	0.84
Hungary	0.89	46	0.82	0.83	0.79	0.79	0.77	0.45	0.77	0.44	0.42	0.57	0.61	0.63
Indonesia	0.81	33	0.61	0.48	0.49	0.58	0.53	0.69	0.58	0.56	0.61	0.60	0.56	0.57
Iran, Islamic Rep. of	0.82	37	0.84	0.82	0.72	0.84	0.84	0.64	0.77	-0.07	-0.02	0.33	0.03	0.27
Israel	0.93	56	0.81	0.82	0.74	0.79	0.79	0.76	0.81	0.71	0.61	0.68	0.64	0.77
Italy	0.85	39	0.58	0.66	0.55	0.50	0.49	0.56	0.59	0.74	0.69	0.69	0.71	0.63
Japan	0.88	45	0.78	0.78	0.76	0.66	0.85	0.69	0.80	0.49	0.31	0.62	0.54	0.57
Jordan	0.88	45	0.79	0.80	0.77	0.69	0.83	0.77	0.78	0.70	0.50	0.47	0.28	0.40
Kazakhstan	0.93	59	0.83	0.75	0.71	0.81	0.82	0.85	0.76	0.74	0.73	0.83	0.65	0.67
Korea, Rep. of	0.92	54	0.76	0.74	0.74	0.80	0.76	0.59	0.80	0.72	0.79	0.79	0.78	0.55
Lebanon	0.89	47	0.84	0.84	0.80	0.62	0.82	0.72	0.83	0.39	0.40	0.52	0.38	0.81
Lithuania	0.79	32	0.72	0.67	0.50	0.54	0.56	0.56	0.45	0.57	0.52	0.65	0.53	0.40
Macedonia, Rep. of	0.84	37	0.71	0.57	0.65	0.68	0.63	0.75	0.53	0.70	0.57	0.31	0.54	0.51
Malaysia	0.94	62	0.83	0.85	0.82	0.77	0.83	0.80	0.84	0.65	0.79	0.80	0.67	0.78
Morocco	0.73	40	-0.21	-0.20	-0.35	0.46	-0.62	0.67	-0.64	0.77	0.83	0.77	0.88	0.72
New Zealand	0.92	52	0.74	0.71	0.70	0.64	0.67	0.70	0.78	0.68	0.74	0.79	0.78	0.76
Norway	0.81	33	0.48	0.40	0.72	0.68	0.61	0.52	0.57	0.66	0.55	0.54	0.54	0.53
Oman	0.89	46	0.72	0.77	0.72	0.80	0.79	0.75	0.72	0.51	0.42	0.64	0.50	0.64
Palestinian Nat'l Auth.	0.79	36	0.91	0.90	0.75	-0.14	0.90	0.36	0.89	0.15	-0.20	0.11	-0.11	0.53
Qatar	0.97	77	0.86	0.91	0.85	0.93	0.94	0.89	0.91	0.85	0.84	0.83	0.78	0.90
Romania	0.86	39	0.71	0.57	0.67	0.73	0.73	0.49	0.66	0.65	0.55	0.63	0.52	0.56
Russian Federation	0.89	46	0.72	0.71	0.57	0.71	0.67	0.68	0.66	0.68	0.70	0.74	0.66	0.61
Saudi Arabia	0.79	40	0.89	0.80	0.40	0.76	0.85	0.05	0.87	-0.50	-0.56	-0.52	-0.52	0.30
Singapore	0.98	80	0.94	0.93	0.90	0.92	0.92	0.84	0.91	0.92	0.86	0.83	0.85	0.93
Slovenia	0.79	32	0.58	0.56	0.53	0.60	0.49	0.48	0.31	0.65	0.69	0.64	0.68	0.41
Sweden	0.86	41	0.71	0.68	0.74	0.69	0.75	0.66	0.57	0.57	0.59	0.44	0.62	0.63
Syrian Arab Republic	0.73	32	0.77	0.62	0.33	0.41	0.67	0.25	0.61	-0.30	-0.58	-0.69	-0.70	-0.56
Thailand	0.90	49	0.74	0.70	0.61	0.54	0.63	0.73	0.77	0.75	0.69	0.80	0.81	0.57
Tunisia	0.70	36	-0.46	-0.65	-0.48	-0.02	-0.67	-0.09	-0.68	0.72	0.85	0.78	0.76	0.32

Exhibit 5: Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2011 Instruction Affected by Mathematics Resource Shortages Scale, Eighth Grade (Continued)

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Factor Loadings for Each Item											
			BCBG09AA	BCBG09AB	BCBG09AC	BCBG09AD	BCBG09AE	BCBG09AF	BCBG09BA	BCBG09BB	BCBG09BC	BCBG09BD	BCBG09BE	BCBG09BF
Turkey	0.85	39	0.65	0.61	0.64	0.66	0.70	0.56	0.60	0.69	0.56	0.59	0.73	0.45
Ukraine	0.85	38	0.60	0.65	0.52	0.60	0.55	0.60	0.49	0.62	0.68	0.70	0.72	0.60
United Arab Emirates	0.94	59	0.86	0.85	0.81	0.91	0.88	0.78	0.88	0.68	0.49	0.66	0.49	0.79
United States	0.91	50	0.74	0.75	0.74	0.69	0.69	0.71	0.66	0.70	0.69	0.63	0.75	0.71
Ninth Grade Participants														
Botswana	0.71	31	0.29	-0.25	0.36	0.55	0.21	0.14	-0.47	0.85	0.88	0.75	0.88	0.24
Honduras	0.86	43	0.70	0.46	0.43	0.76	0.47	0.40	0.08	0.82	0.77	0.83	0.84	0.81
South Africa	0.86	41	0.51	0.33	0.48	0.73	0.39	0.73	0.40	0.78	0.75	0.78	0.78	0.71
Benchmarking Participants														
Alberta, Canada	0.88	43	0.67	0.70	0.64	0.63	0.68	0.72	0.62	0.63	0.62	0.58	0.67	0.67
Ontario, Canada	0.87	41	0.61	0.56	0.60	0.55	0.64	0.67	0.61	0.69	0.68	0.65	0.74	0.62
Quebec, Canada	0.88	44	0.65	0.69	0.59	0.59	0.72	0.68	0.64	0.72	0.63	0.60	0.71	0.71
Abu Dhabi, UAE	0.93	57	0.87	0.87	0.78	0.90	0.89	0.75	0.88	0.60	0.41	0.68	0.40	0.80
Dubai, UAE	0.96	71	0.88	0.86	0.88	0.92	0.90	0.84	0.90	0.84	0.71	0.77	0.74	0.84
Alabama, US	0.91	51	0.77	0.74	0.67	0.73	0.68	0.83	0.78	0.69	0.65	0.68	0.64	0.71
California, US	0.91	52	0.68	0.74	0.80	0.74	0.76	0.69	0.65	0.79	0.71	0.70	0.71	0.68
Colorado, US	0.90	48	0.74	0.68	0.53	0.66	0.56	0.67	0.62	0.76	0.75	0.84	0.71	0.74
Connecticut, US	0.93	55	0.70	0.70	0.71	0.58	0.72	0.73	0.72	0.79	0.78	0.81	0.87	0.77
Florida, US	0.92	54	0.77	0.80	0.68	0.72	0.71	0.86	0.76	0.70	0.69	0.62	0.77	0.73
Indiana, US	0.87	41	0.72	0.75	0.62	0.64	0.45	0.68	0.68	0.70	0.64	0.58	0.62	0.60
Massachusetts, US	0.92	54	0.74	0.73	0.65	0.66	0.69	0.79	0.71	0.82	0.79	0.72	0.80	0.69
Minnesota, US	0.87	41	0.65	0.53	0.42	0.32	0.59	0.63	0.62	0.76	0.75	0.76	0.75	0.70
North Carolina, US	0.89	46	0.63	0.69	0.76	0.48	0.75	0.68	0.56	0.70	0.77	0.71	0.71	0.67

Exhibit 6: Relationship Between the TIMSS 2011 Instruction Affected by Mathematics Resource Shortages Scale, Eighth Grade, and TIMSS 2011 Mathematics Achievement

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r^2)	
Armenia	0.08	0.01	0.00
Australia	0.22	0.05	0.04
Bahrain	0.16	0.02	0.05
Chile	0.23	0.05	0.08
Chinese Taipei	0.01	0.00	0.00
England	-0.10	0.01	0.01
Finland	0.08	0.01	0.00
Georgia	0.06	0.00	0.01

Exhibit 6: Relationship Between the TIMSS 2011 Instruction Affected by Mathematics Resource Shortages Scale, Eighth Grade, and TIMSS 2011 Mathematics Achievement (Continued)

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r ²)	
Ghana	-0.08	0.01	0.01
Hong Kong SAR	0.13	0.02	0.04
Hungary	0.07	0.01	0.00
Indonesia	-0.28	0.08	0.06
Iran, Islamic Rep. of	0.15	0.02	0.02
Israel	0.29	0.09	0.09
Italy	0.12	0.01	0.01
Japan	0.10	0.01	0.01
Jordan	0.02	0.00	0.01
Kazakhstan	0.08	0.01	0.01
Korea, Rep. of	0.05	0.00	0.01
Lebanon	0.11	0.01	0.09
Lithuania	0.05	0.00	0.00
Macedonia, Rep. of	0.05	0.00	0.01
Malaysia	0.13	0.02	0.02
Morocco	-0.04	0.00	0.13
New Zealand	0.13	0.02	0.01
Norway	0.05	0.00	0.00
Oman	0.06	0.00	0.01
Palestinian Nat'l Auth.	-0.01	0.00	0.00
Qatar	0.19	0.04	0.06
Romania	0.13	0.02	0.01
Russian Federation	0.03	0.00	0.00
Saudi Arabia	-0.11	0.01	0.02
Singapore	0.07	0.01	0.01
Slovenia	0.02	0.00	0.00
Sweden	0.05	0.00	0.01
Syrian Arab Republic	-0.01	0.00	0.01
Thailand	0.11	0.01	0.01
Tunisia	-0.05	0.00	0.00
Turkey	0.07	0.00	0.02
Ukraine	-0.02	0.00	0.00
United Arab Emirates	0.19	0.04	0.04
United States	0.12	0.01	0.04
International Median	0.07	0.01	0.01

Exhibit 6: Relationship Between the TIMSS 2011 Instruction Affected by Mathematics Resource Shortages Scale, Eighth Grade, and TIMSS 2011 Mathematics Achievement (Continued)

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r ²)	
Ninth Grade Participants			
Botswana	0.06	0.00	0.01
Honduras	0.21	0.04	0.06
South Africa	0.15	0.02	0.17
Benchmarking Participants			
Alberta, Canada	0.10	0.01	0.01
Ontario, Canada	0.09	0.01	0.01
Quebec, Canada	0.06	0.00	0.00
Abu Dhabi, UAE	0.20	0.04	0.05
Dubai, UAE	0.28	0.08	0.07
Alabama, US	0.21	0.04	0.03
California, US	-0.12	0.01	0.03
Colorado, US	0.20	0.04	0.03
Connecticut, US	0.22	0.05	0.05
Florida, US	0.02	0.00	0.03
Indiana, US	-0.01	0.00	0.01
Massachusetts, US	0.15	0.02	0.03
Minnesota, US	0.08	0.01	0.00
North Carolina, US	-0.08	0.01	0.03