

TIMSS

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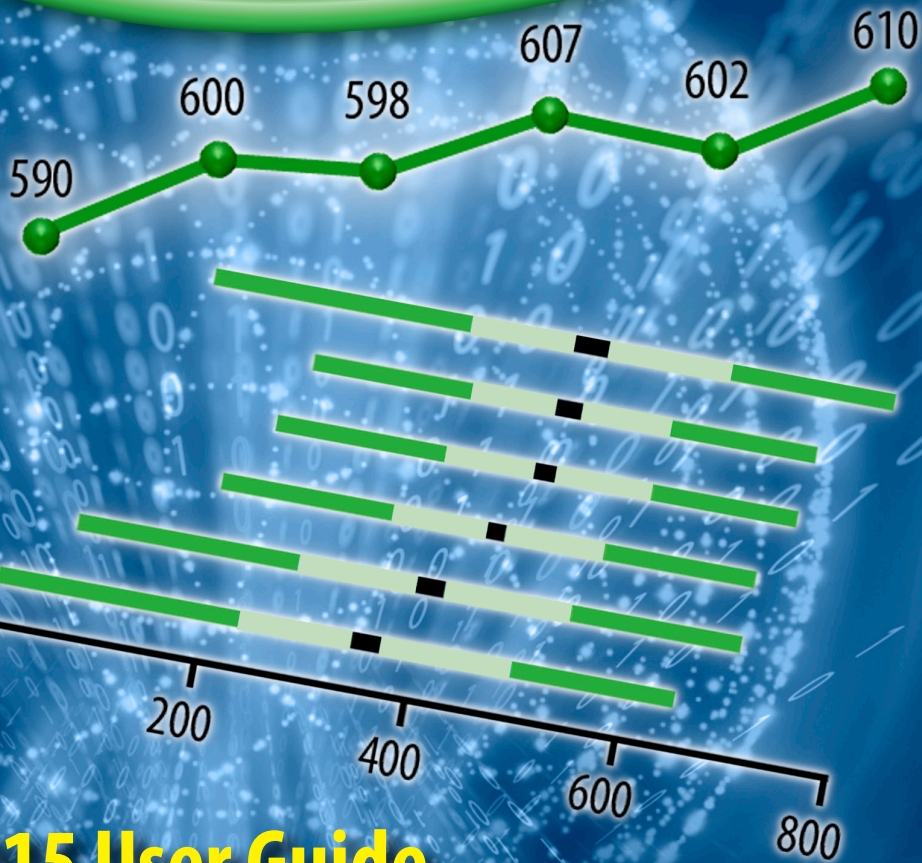
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TIMSS Advanced 2015 User Guide for the International Database

SUPPLEMENT 3

Variables Derived from the Student,
Teacher, and School Questionnaire Data

Supplement 3

Variables Derived from the Student, Teacher, and School Questionnaire Data

Overview

This supplement contains documentation on all the derived variables contained in the TIMSS Advanced 2015 data files. These variables were used to report background data in the *TIMSS Advanced 2015 International Results in Advanced Mathematics and Physics* report, and are made available as part of this database to be used in secondary analyses. This supplement has five sections corresponding to the five context questionnaires administered to collect these background data.

- Section 1: Advanced Mathematics Student Questionnaire
- Section 2: Physics Student Questionnaire
- Section 3: Advanced Mathematics Teacher Questionnaire
- Section 4: Physics Teacher Questionnaire
- Section 5: School Questionnaire – Advanced Mathematics & Physics

The following information is provided for each derived variable:

- Derived Variable Name
- Variable Label
- Title of International Report Exhibit
- Report Location
- A procedural description of how the derived variable was computed, including missing data rules if different from the general missing data rule described below

Derived Variable Naming Convention

The derived variables are named according to the variable-naming convention in the TIMSS Advanced 2015 International Database (see Chapter 4 of the User Guide). Exhibits 1 and 2 display the naming conventions and data sources for the derived variables for advanced mathematics and physics.

Exhibit 1 Variables Derived from Advanced Mathematics Data

Variable Naming Convention	Data Source
MSDG****	Variables derived from student background data
MTDG****	Variables derived from general teacher background data
MTDM****	Variables derived from teacher background data related to advanced mathematics
MCDG****	Variables derived from school background data

Exhibit 2 Variables Derived from Physics Data

Variable Naming Convention	Data Source
PSDG****	Variables derived from student background data
PTDG****	Variables derived from general teacher background data
PTDP****	Variables derived from teacher background data related to physics
PCDG****	Variables derived from school background data

Missing Rule for Derived Variables

When calculating derived variables, students were only included if they had valid responses for at least 2/3 of the source variables. Students who did not have responses for 2/3 of the source variables were considered missing for the derived variable.



SECTION 1: ADVANCED MATHEMATICS STUDENT QUESTIONNAIRE

TIMSS ADVANCED 2015 USER GUIDE
FOR THE INTERNATIONAL DATABASE



IEA

TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

Derived Variable Name: MSDG06S

Variable Label: Number of Home Study Supports

Subject: M

Title of International Report Exhibit

Home Educational Resources

Report Location

Advanced Mathematics 4.1

Procedure

Based on responses to the following question in the Advanced Mathematics Student Questionnaire:

SQM-06d,e: Do you have any of these things in your home?

"Study desk/table for your use" (MSBG06F)

"Your own room" (MSBG06G)

Response options: 1 = "Yes"; 2 = "No"

Derive MSDG06S:

0 (MSBG06F = 2 AND MSBG06G = 2) = "Neither study desk/table nor own room"

1 ((MSBG06F = 1 AND MSBG06G = 2) OR (MSBG06F = 2 AND MSBG06G = 1)) = "Either study desk/table or own room but not both"

2 (MSBG06F = 1 AND MSBG06G = 1) = "Both study desk/table and own room"

Set MSDG06S to missing if either source variable is missing.

0 = "Neither study desk/table nor own room", 1 = "Either study desk/table or own room but not both", 2 = "Both study desk/table and own room"

Derived Variable Name: MSDGEDUP

Variable Label: Parents' Highest Education Level

Subject: M

Title of International Report Exhibit

Home Educational Resources

Report Location

Advanced Mathematics 4.1

Procedure

Based on responses to the following questions in the Advanced Mathematics Student Questionnaire:

SQM-07A: What is the highest level of education completed by your mother (or stepmother or female guardian)?
(MSBG07A)

SQM-07B: What is the highest level of education completed by your father (or stepfather or male guardian)?
(MSBG07B)

Response options: 1 = "Some <Primary education— ISCED Level 1 or Lower secondary education—ISCED Level 2> or did not go to school", 2 = "<Lower secondary education—ISCED Level 2>", 3 = "<Upper secondary education—ISCED Level 3>", 4 = "<Post-secondary, non-tertiary education—ISCED Level 4>", 5 = "<Short-cycle tertiary education—ISCED Level 5>", 6 = "<Bachelor's or equivalent level—ISCED Level 6>", 7 = "<Master's or equivalent level—ISCED Level 7>", 8 = "<Doctor or equivalent level—ISCED Level 8>", 9 = "I don't know"

Recode MSBG07A as follows:

If MSBG07A = 6, 7, OR 8: Recode to 1 ("Finished University or higher")

If MSBG07A = 4 OR 5: Recode to 2 ("Finished Post-Secondary Education")

If MSBG07A = 3: Recode to 3 ("Finished Upper Secondary")

If MSBG07A = 2: Recode to 4 ("Finished Lower Secondary")

If MSBG07A = 1: Recode to 5 ("Finished Some Primary or Lower Secondary or Did Not Go to School")

If MSBG07A = 9: Recode to 6 ("Not Applicable")

Recode MSBG07B in the same way.

Derive MSDGEDUP:

Using these categories, the smaller value of the recoded variables MSBG07A and MSBG07B becomes MSDGEDUP.

For purposes of creating MSDGEDUP, treat the response of 6 = "Not Applicable" to recoded MSBG07A and MSBG07B as missing.

After scoring, if student does not have valid response of 1, 2, 3, 4, or 5 on either of the recoded variables MSBG07A or MSBG07B, then set MSDGEDUP to missing.

1 = "Finished University or higher", 2 = "Finished Post-Secondary Education", 3 = "Finished Upper Secondary", 4 = "Finished Lower Secondary", 5 = "Finished Some Primary or Lower Secondary or Did Not Go to School", 6 = "Not Applicable"

Derived Variable Name: MSDGOCCP

Variable Label: Parents' Highest Occupation Level

Subject: M

Title of International Report Exhibit

Home Educational Resources

Report Location

Advanced Mathematics 4.1

Procedure

Based on responses to the following question in the Advanced Mathematics Student Questionnaire:

SQM-8a,b: What kind of work do the child's father (or stepfather or male guardian) and mother (or stepmother or female guardian) do for their main jobs?

"Child's father" (MSBG08A)

"Child's mother" (MSBG08B)

Response options: 1 = "Has never worked for pay"; 2 = "Small business owner"; 3 = "Clerk"; 4 = "Service or sales worker"; 5 = "Skilled agricultural or fishery worker"; 6 = "Craft or trade worker"; 7 = "Plant or machine operator"; 8 = "General laborer"; 9 = "Corporate manager or senior official"; 10 = "Professional"; 11 = "Technician or associate professional"; 12 = "I don't know"

Recode MSBG08A as follows:

If MSBG08A = 9, 10, or 11: Recode to 1 ("Professional")

If MSBG08A = 2: Recode to 2 ("Small Business Owner")

If MSBG08A = 3 or 4: Recode to 3 ("Clerical")

If MSBG08A = 5, 6, or 7: Recode to 4 ("Skilled Worker")

If MSBG08A = 8: Recode to 5 ("General Laborer")

If MSBG08A = 1: Recode to 6 ("Never Worked Outside Home")

If MSBG08A = 12: Recode to 7 ("Not Applicable")

Recode MSBG08B in the same way.

Derive MSDGOCCP:

Using these categories, the smaller value of the recoded variables MSBG08A and MSBG08B becomes MSDGOCCP.

For purposes of creating MSDGOCCP, treat the value of 7 = "Not Applicable" for recoded MSBG08A and MSBG08B as missing.

After scoring, if student does not have valid response of 1, 2, 3, 4, 5, or 6 on either of the recoded variables MSBG08A or MSBG08B, then set MSDGOCCP to missing.

1 = "Professional", 2 = "Small Business Owner", 3 = "Clerical", 4 = "Skilled Worker", 5 = "General Laborer", 6 = "Never Worked Outside Home", 7 = "Not Applicable"

SECTION 2:
PHYSICS STUDENT
QUESTIONNAIRE

TIMSS ADVANCED 2015 USER GUIDE
FOR THE INTERNATIONAL DATABASE



IEA

TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

Derived Variable Name: PSDG06S

Variable Label: Number of Home Study Supports

Subject: P

Title of International Report Exhibit

Home Educational Resources

Report Location

Physics 4.1

Procedure

Based on responses to the following question in the Physics Student Questionnaire:

SQP-06d,e: Do you have any of these things in your home?

"Study desk/table for your use" (PSBG06F)

"Your own room" (PSBG06G)

Response options: 1 = "Yes"; 2 = "No"

Derive PSDG06S:

0 (PSBG06F = 2 AND PSBG06G = 2) = "Neither study desk/table nor own room"

1 ((PSBG06F = 1 AND PSBG06G = 2) OR (PSBG06F = 2 AND PSBG06G = 1)) = "Either study desk/table or own room but not both"

2 (PSBG06F = 1 AND PSBG06G = 1) = "Both study desk/table and own room"

Set PSDG06S to missing if either source variable is missing.

0 = "Neither study desk/table nor own room", 1 = "Either study desk/table or own room but not both", 2 = "Both study desk/table and own room"

Derived Variable Name: PSDGEDUP

Variable Label: Parents' Highest Education Level

Subject: P

Title of International Report Exhibit

Home Educational Resources

Report Location

Physics 4.1

Procedure

Based on responses to the following questions in the Physics Student Questionnaire:

SQP-07A: What is the highest level of education completed by your mother (or stepmother or female guardian)?
(PSBG07A)

SQP-07B: What is the highest level of education completed by your father (or stepfather or male guardian)?
(PSBG07B)

Response options: 1 = "Some <Primary education— ISCED Level 1 or Lower secondary education—ISCED Level 2> or did not go to school", 2 = "<Lower secondary education—ISCED Level 2>", 3 = "<Upper secondary education—ISCED Level 3>", 4 = "<Post-secondary, non-tertiary education—ISCED Level 4>", 5 = "<Short-cycle tertiary education—ISCED Level 5>", 6 = "<Bachelor's or equivalent level—ISCED Level 6>", 7 = "<Master's or equivalent level—ISCED Level 7>", 8 = "<Doctor or equivalent level—ISCED Level 8>", 9 = "I don't know"

Recode PSBG07A as follows:

If PSBG07A = 6, 7, OR 8: Recode to 1 ("Finished University or higher")

If PSBG07A = 4 OR 5: Recode to 2 ("Finished Post-Secondary Education")

If PSBG07A = 3: Recode to 3 ("Finished Upper Secondary")

If PSBG07A = 2: Recode to 4 ("Finished Lower Secondary")

If PSBG07A = 1: Recode to 5 ("Finished Some Primary or Lower Secondary or Did Not Go to School")

If PSBG07A = 9: Recode to 6 ("Not Applicable")

Recode PSBG07B in the same way.

Derive PSDGEDUP:

Using these categories, the smaller value of the recoded variables PSBG07A and PSBG07B becomes PSDGEDUP.

For purposes of creating PSDGEDUP, treat the response of 6 = "Not Applicable" to recoded PSBG07A and PSBG07B as missing.

After scoring, if student does not have valid response of 1, 2, 3, 4, or 5 on either of the recoded variables PSBG07A or PSBG07B, then set PSDGEDUP to missing.

1 = "Finished University or higher", 2 = "Finished Post-Secondary Education", 3 = "Finished Upper Secondary", 4 = "Finished Lower Secondary", 5 = "Finished Some Primary or Lower Secondary or Did Not Go to School", 6 = "Not Applicable"

Derived Variable Name: PSDGOCCP

Variable Label: Parents' Highest Occupation Level

Subject: P

Title of International Report Exhibit

Home Educational Resources

Report Location

Physics 4.1

Procedure

Based on responses to the following question in the Physics Student Questionnaire:

SQP-8a,b: What kind of work do the child's father (or stepfather or male guardian) and mother (or stepmother or female guardian) do for their main jobs?

"Child's father" (PSBG08A)

"Child's mother" (PSBG08B)

Response options: 1 = "Has never worked for pay"; 2 = "Small business owner"; 3 = "Clerk"; 4 = "Service or sales worker"; 5 = "Skilled agricultural or fishery worker"; 6 = "Craft or trade worker"; 7 = "Plant or machine operator"; 8 = "General laborer"; 9 = "Corporate manager or senior official"; 10 = "Professional"; 11 = "Technician or associate professional"; 12 = "I don't know"

Recode PSBG08A as follows:

If PSBG08A = 9, 10, or 11: Recode to 1 ("Professional")

If PSBG08A = 2: Recode to 2 ("Small Business Owner")

If PSBG08A = 3 or 4: Recode to 3 ("Clerical")

If PSBG08A = 5, 6, or 7: Recode to 4 ("Skilled Worker")

If PSBG08A = 8: Recode to 5 ("General Laborer")

If PSBG08A = 1: Recode to 6 ("Never Worked Outside Home")

If PSBG08A = 12: Recode to 7 ("Not Applicable")

Recode PSBG08B in the same way.

Derive PSDGOCCP:

Using these categories, the smaller value of the recoded variables PSBG08A and PSBG08B becomes PSDGOCCP.

For purposes of creating PSDGOCCP, treat the value of 7 = "Not Applicable" for recoded PSBG08A and PSBG08B as missing.

After scoring, if student does not have valid response of 1, 2, 3, 4, 5, or 6 on either of the recoded variables PSBG08A or PSBG08B, then set PSDGOCCP to missing.

1 = "Professional", 2 = "Small Business Owner", 3 = "Clerical", 4 = "Skilled Worker", 5 = "General Laborer", 6 = "Never Worked Outside Home", 7 = "Not Applicable"



SECTION 3: ADVANCED MATHEMATICS TEACHER QUESTIONNAIRE

TIMSS ADVANCED 2015 USER GUIDE
FOR THE INTERNATIONAL DATABASE



IEA

TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

Derived Variable Name: MTDG05

Variable Label: Teachers Majored in Math and Math Ed

Subject: M

Title of International Report Exhibit

Advanced Mathematics Teachers Majored in Mathematics and Education

Report Location

Advanced Mathematics 8.3

Procedure

Based on responses to the following questions in the Advanced Mathematics Teacher Questionnaire:

TQM-04: What is the highest level of formal education you have completed? (MTBG04)

Response options: 1 = "Did not complete <tertiary> education", 2 = "<Short-cycle tertiary education—ISCED Level 5>", 3 = "<Bachelor's or equivalent level—ISCED Level 6>", 4 = "<Master's or equivalent level—ISCED Level 7>", 5 = "<Doctor or equivalent level—ISCED Level 8>"

TQM-05a,b,c,d,e,f,g,h,i,j,k: During your <post-secondary> education, what was your major or main area(s) of study?

"Mathematics" (MTBG05A)

"Physics" (MTBG05B)

"Biology" (MTBG05C)

"Chemistry" (MTBG05D)

"<Earth Science>" (MTBG05E)

"Engineering" (MTBG05F)

"Education - Mathematics" (MTBG05G)

"Education - Physics" (MTBG05H)

"Education - Science" (MTBG05I)

"Education - General" (MTBG05J)

"Other" (MTBG05K)

Response options: 1 = "Yes", 2 = "No"

Derive MTDG05:

1 (MTBG05A=1 AND MTBG05G=1 AND MTBG04 does not equal 1) = "Major in Mathematics and Mathematics Education"

2 (MTBG05A=1 AND MTBG05G=2 AND MTBG04 does not equal 1) = "Major in Mathematics but No Major in Mathematics Education"

3 (MTBG05A=2 AND MTBG05G=1 AND MTBG04 does not equal 1) = "Major in Mathematics Education but No Major in Mathematics"

4 (MTBG05A=2 AND MTBG05G=2 AND MTBG04 does not equal 1) = "All Other Majors"

Otherwise, set to missing.

1 = "Major in Mathematics and Mathematics Education", 2 = "Major in Mathematics but No Major in Mathematics Education", 3 = "Major in Mathematics Education but No Major in Mathematics", 4 = "All Other Majors"

Derived Variable Name: MTDM21AL

Variable Label: Pct Std Taught Algebra Topics

Subject: M

Title of International Report Exhibit

Percentages of Students Taught the TIMSS Advanced Advanced Mathematics Topics

Report Location

Advanced Mathematics 9.7

Procedure

Based on the responses to the following questions in the Advanced Mathematics Teacher Questionnaire:

TQM-21Aa,b,c,d,e,f,g,h: The following list includes the main topics addressed by the TIMSS Advanced mathematics test. Choose the response that best describes when the students in this class have been taught each topic. If a topic was in the curriculum before this year, please choose "Mostly taught before this year." If a topic was taught half this year but not yet completed, please choose "Mostly taught this year." If a topic is not in the curriculum, please choose "Not yet taught or just introduced."

"Operations with exponential, logarithmic, polynomial, rational, and radical expressions" (MTBG21AA)

"Operations with complex numbers" (MTBG21AB)

"Evaluating algebraic expressions (e.g., exponential, logarithmic, polynomial, rational, and radical)" (MTBG21AC)

"The n th term of arithmetic and geometric sequences and the sums of finite and infinite series" (MTBG21AD)

"Linear, simultaneous, and quadratic equations and inequalities; radical equations, logarithmic, and exponential equations" (MTBG21AE)

"Slopes, y -axis intercepts, and points of intersection of straight lines" (MTBG21AF)

"Equivalent representations of functions, including composite functions, as ordered pairs, tables, graphs, formulas, or words" (MTBG21AG)

"Properties of functions including domain and range" (MTBG21AH)

Response options: 1 = "Mostly taught before this year", 2 = "Mostly taught this year", 3 = "Not yet taught or just introduced"

Derive MTDM21AL:

For each topic, compute the percent of students whose teachers selected 1 = "Mostly taught before this year" OR 2 = "Mostly taught this year".

Then compute the average across the percentages of students taught the content domain.

Set MTDM21AL to missing if more than one-third of the source variables are missing.

Derived Variable Name: MTDM21CA

Variable Label: Pct Std Taught Calculus Topics

Subject: M

Title of International Report Exhibit

Percentages of Students Taught the TIMSS Advanced Advanced Mathematics Topics

Report Location

Advanced Mathematics 9.7

Procedure

Based on the responses to the following questions in the Advanced Mathematics Teacher Questionnaire:

TQM-21Ba,b,c,d,e,f,g: The following list includes the main topics addressed by the TIMSS Advanced mathematics test. Choose the response that best describes when the students in this class have been taught each topic. If a topic was in the curriculum before this year, please choose "Mostly taught before this year." If a topic was taught half this year but not yet completed, please choose "Mostly taught this year." If a topic is not in the curriculum, please choose "Not yet taught or just introduced."

"Limits of functions" (MTBG21BA)

"Conditions for continuity and differentiability of functions" (MTBG21BB)

"Differentiation of functions (including polynomial, exponential, logarithmic, trigonometric, rational, and radical functions); differentiation of products, quotients, and composite functions" (MTBG21BC)

"Using derivatives to solve problems (e.g., in optimization and rates of change)" (MTBG21BD)

"Using first and second derivatives to determine slope and local extrema of functions" (MTBG21BE)

"Using derivatives to determine points of inflection of functions" (MTBG21BF)

"Integrating functions (including polynomial, exponential, trigonometric, and rational functions); evaluating definite integrals, including calculation of areas" (MTBG21BG)

Response options: 1 = "Mostly taught before this year", 2 = "Mostly taught this year", 3 = "Not yet taught or just introduced"

Derive MTDM21CA:

For each topic, compute the percent of students whose teachers selected 1 = "Mostly taught before this year" OR 2 = "Mostly taught this year".

Then compute the average across the percentages of students taught the content domain.

Set MTDM21CA to missing if more than one-third of the source variables are missing.

Derived Variable Name: MTDM21GE

Variable Label: Pct Std Taught Geometry Topics

Subject: M

Title of International Report Exhibit

Percentages of Students Taught the TIMSS Advanced Advanced Mathematics Topics

Report Location

Advanced Mathematics 9.7

Procedure

Based on the responses to the following questions in the Advanced Mathematics Teacher Questionnaire:

TQM-21Ca,b,c,d: The following list includes the main topics addressed by the TIMSS Advanced mathematics test. Choose the response that best describes when the students in this class have been taught each topic. If a topic was in the curriculum before this year, please choose "Mostly taught before this year." If a topic was taught half this year but not yet completed, please choose "Mostly taught this year." If a topic is not in the curriculum, please choose "Not yet taught or just introduced."

"Properties of geometric figures in two and three dimensions" (MTBG21CA)

"Properties of vectors and their sums and differences" (MTBG21CB)

"Trigonometric properties of triangles (sine, cosine, and tangent)" (MTBG21CC)

"Trigonometric functions and their graphs" (MTBG21CD)

Response options: 1 = "Mostly taught before this year", 2 = "Mostly taught this year", 3 = "Not yet taught or just introduced"

Derive MTDM21GE:

For each topic, compute the percent of students whose teachers selected 1 = "Mostly taught before this year" OR 2 = "Mostly taught this year".

Then compute the average across the percentages of students taught the content domain.

Set MTDM21GE to missing if more than one-third of the source variables are missing.

SECTION 4:
PHYSICS TEACHER
QUESTIONNAIRE

TIMSS ADVANCED 2015 USER GUIDE
FOR THE INTERNATIONAL DATABASE



IEA

TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

Derived Variable Name: PTDG05

Variable Label: Teachers Majored in Physics and Physics Ed

Subject: P

Title of International Report Exhibit

Physics Teachers Majored in Physics and Education

Report Location

Physics 8.3

Procedure

Based on responses to the following questions in the Physics Teacher Questionnaire:

TQP-04: What is the highest level of formal education you have completed? (MTBG04)

Response options: 1 = "Did not complete <tertiary> education", 2 = "<Short-cycle tertiary education—ISCED Level 5>", 3 = "<Bachelor's or equivalent level—ISCED Level 6>", 4 = "<Master's or equivalent level—ISCED Level 7>", 5 = "<Doctor or equivalent level—ISCED Level 8>"

TQP-05a,b,c,d,e,f,g,h,i,j,k: During your <post-secondary> education, what was your major or main area(s) of study?

"Mathematics" (PTBG05A)

"Physics" (PTBG05B)

"Biology" (PTBG05C)

"Chemistry" (PTBG05D)

"<Earth Science>" (PTBG05E)

"Engineering" (PTBG05F)

"Education - Mathematics" (PTBG05G)

"Education - Physics" (PTBG05H)

"Education - Science" (PTBG05I)

"Education - General" (PTBG05J)

"Other" (PTBG05K)

Response options: 1 = "Yes", 2 = "No"

Derive PTDG05:

1 (PTBG05B=1 AND PTBG05H=1 AND PTBG04 does not equal 1) = "Major in Physics and Physics Education"

2 (PTBG05B=1 AND PTBG05H=2 AND PTBG04 does not equal 1) = "Major in Physics but No Major in Physics Education"

3 (PTBG05B=2 AND PTBG05H=1 AND PTBG04 does not equal 1) = "Major in Physics Education but No Major in Physics"

4 (PTBG05B=2 AND PTBG05H=2 AND PTBG04 does not equal 1) = "All Other Majors"

Otherwise, set to missing.

1 = "Major in Mathematics and Mathematics Education", 2 = "Major in Mathematics but No Major in Mathematics Education", 3 = "Major in Mathematics Education but No Major in Mathematics", 4 = "All Other Majors"

Derived Variable Name: PTDP22ME

Variable Label: Pct Std Taught Mech and Therm Topics

Subject: P

Title of International Report Exhibit

Percentages of Students Taught the TIMSS Advanced Physics Topics

Report Location

Physics 9.8

Procedure

Based on the responses to the following questions in the Physics Teacher Questionnaire:

TQP-22Aa,b,c,d,e,f,g,h,i: The following list includes the main topics addressed by the TIMSS Advanced physics test. Choose the response that best describes when the students in this class have been taught each topic. If a topic was in the curriculum before this year, please choose "Mostly taught before this year." If a topic was taught half this year but not yet completed, please choose "Mostly taught this year." If a topic is not in the curriculum, please choose "Not yet taught or just introduced."

"Applying Newton's laws and laws of motion" (PTBG22AA)

"Forces, including frictional force, acting on a body" (PTBG22AB)

"Forces acting on a body moving in a circular path; the body's centripetal acceleration, speed, and circling time" (PTBG22AC)

"The law of gravitation in relation to the movement of celestial objects" (PTBG22AD)

"Kinetic and potential energy; conservation of mechanical energy" (PTBG22AE)

"The law of conservation of momentum; elastic and inelastic collisions" (PTBG22AF)

"The first law of thermodynamics" (PTBG22AG)

"Heat transfer and specific heat capacities" (PTBG22AH)

"The law of ideal gases; expansion of solids and liquids in relation to temperature change" (PTBG22AI)

Response options: 1 = "Mostly taught before this year", 2 = "Mostly taught this year", 3 = "Not yet taught or just introduced"

Derive PTDP22ME:

For each topic, compute the percent of students whose teachers selected 1 = "Mostly taught before this year" OR 2 = "Mostly taught this year".

Then compute the average across the percentages of students taught the content domain.

Set PTDP22ME to missing if more than one-third of the source variables are missing.

Derived Variable Name: PTDP22EL

Variable Label: Pct Std Taught Elec and Magn Topics

Subject: P

Title of International Report Exhibit

Percentages of Students Taught the TIMSS Advanced Physics Topics

Report Location

Physics 9.8

Procedure

Based on the responses to the following questions in the Physics Teacher Questionnaire:

TQP-22Ba,b,c,d,e,f: The following list includes the main topics addressed by the TIMSS Advanced physics test.

Choose the response that best describes when the students in this class have been taught each topic. If a topic was in the curriculum before this year, please choose "Mostly taught before this year." If a topic was taught half this year but not yet completed, please choose "Mostly taught this year." If a topic is not in the curriculum, please choose "Not yet taught or just introduced."

"Electrostatic attraction or repulsion between isolated charged particles – Coulomb's law" (PTBG22BA)

"Charged particles in an electric field" (PTBG22BB)

"Electrical circuits; using Ohm's law and Joule's law" (PTBG22BC)

"Charged particles in a magnetic field" (PTBG22BD)

"Relationship between magnetism and electricity; magnetic fields around electric conductors; electromagnetic induction" (PTBG22BE)

"Faraday's and Lenz's laws of induction" (PTBG22BF)

Response options: 1 = "Mostly taught before this year", 2 = "Mostly taught this year", 3 = "Not yet taught or just introduced"

Derive PTDP22EL:

For each topic, compute the percent of students whose teachers selected 1 = "Mostly taught before this year" OR 2 = "Mostly taught this year".

Then compute the average across the percentages of students taught the content domain.

Set PTDP22EL to missing if more than one-third of the source variables are missing.

Derived Variable Name: PTDP22AN

Variable Label: Pct Std Taught Atom and Nucl Topics

Subject: P

Title of International Report Exhibit

Percentages of Students Taught the TIMSS Advanced Physics Topics

Report Location

Physics 9.8

Procedure

Based on the responses to the following questions in the Physics Teacher Questionnaire:

TQP-22Ca,b,c,d,e,f,g: The following list includes the main topics addressed by the TIMSS Advanced physics test. Choose the response that best describes when the students in this class have been taught each topic. If a topic was in the curriculum before this year, please choose "Mostly taught before this year." If a topic was taught half this year but not yet completed, please choose "Mostly taught this year." If a topic is not in the curriculum, please choose "Not yet taught or just introduced."

"Mechanical waves; the relationship between speed, frequency, and wavelength" (PTBG22CA)

"Electromagnetic radiation; wavelength and frequency of various types of waves (radio, infrared, visible light, x-rays, gamma rays)" (PTBG22CB)

"Thermal radiation, temperature, and wavelength" (PTBG22CC)

"Reflection, refraction, interference, and diffraction" (PTBG22CD)

"The structure of the atom and its nucleus; atomic number and atomic mass; electromagnetic emission and absorption and the behavior of electrons" (PTBG22CE)

"Wave-particle duality and the photoelectric effect; types of nuclear reactions and their role in nature (e.g., in stars) and society; radioactive isotopes" (PTBG22CF)

"Mass-energy equivalence in nuclear reactions and particle transformations" (PTBG22CG)

Response options: 1 = "Mostly taught before this year", 2 = "Mostly taught this year", 3 = "Not yet taught or just introduced"

Derive PTDP22AN:

For each topic, compute the percent of students whose teachers selected 1 = "Mostly taught before this year" OR 2 = "Mostly taught this year".

Then compute the average across the percentages of students taught the content domain.

Set PTDP22AN to missing if more than one-third of the source variables are missing.

SECTION 5:
SCHOOL QUESTIONNAIRE –
ADVANCED MATHEMATICS
& PHYSICS

TIMSS ADVANCED 2015 USER GUIDE
FOR THE INTERNATIONAL DATABASE



IEA

TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

Derived Variable Name: MCDG03

Variable Label: School Composition by Std Background

Subject: M

Title of International Report Exhibit

School Composition by Economic Background of the Student Body

Report Location

Advanced Mathematics 5.1

Procedure

Based on responses to the following questions in the School Questionnaire:

SCQ-3: Approximately what percentage of students in your school have the following backgrounds?

"Come from economically disadvantaged homes" (MCBG03A)

"Come from economically affluent homes" (MCBG03B)

Response options: 1 = "0 to 10%", 2 = "11 to 25%", 3 = "26 to 50%", 4 = "More than 50%"

Derive MCDG03:

1 (MCBG03A<=2 AND MCBG03B >= 3) = "Schools With More Affluent Than Disadvantaged Students"

3 (MCBG03A >=3 AND MCBG03B <= 2) = "Schools With More Disadvantaged Than Affluent Students"

2 (All other combinations of MCBG03A and MCBG03B) = "Schools with Neither More Affluent nor More Disadvantaged Students"

Set MCDG03 to missing if either source variable is missing.

1 = "Schools With More Affluent Than Disadvantaged Students", 2 = "Schools with Neither More Affluent nor More Disadvantaged Students", 3 = "Schools With More Disadvantaged Than Affluent Students"

Derived Variable Name: MCDG07HY

Variable Label: Total Instructional Hours per Year

Subject: M

Title of International Report Exhibit

Instructional Time Spent on Advanced Mathematics

Report Location

Advanced Mathematics 9.1

Procedure

Based on responses to the following questions in the School Questionnaire:

SCQ-07A: How many days per year is your school open for instruction? (MCBG07A)

(Open-response item)

SCQ-07B: What is the total instructional time, excluding breaks, in a typical day? (MCBG07B)

(Open-response item; response is in terms of minutes)

Derive MCDG07HY:

Step 1: Compute instructional hours per day:

Divide MCBG07B by 60.

Step 2: Compute hours of school per year:

Multiply the result of Step 1 by MCBG07A.

Set MCDG07HY to missing if either source variable is missing.

Derived Variable Name: PCDG03

Variable Label: School Composition by Std Background

Subject: P

Title of International Report Exhibit

School Composition by Economic Background of the Student Body

Report Location

Physics 5.1

Procedure

Based on responses to the following questions in the School Questionnaire:

SCQ-3: Approximately what percentage of students in your school have the following backgrounds?

"Come from economically disadvantaged homes" (PCBG03A)

"Come from economically affluent homes" (PCBG03B)

Response options: 1 = "0 to 10%", 2 = "11 to 25%", 3 = "26 to 50%", 4 = "More than 50%"

Derive PCDG03:

1 (PCBG03A <= 2 AND PCBG03B >= 3) = "Schools With More Affluent Than Disadvantaged Students"

3 (PCBG03A >= 3 AND PCBG03B <= 2) = "Schools With More Disadvantaged Than Affluent Students"

2 (All other combinations of PCBG03A and PCBG03B) = "Schools with Neither More Affluent nor More Disadvantaged Students"

Set PCDG03 to missing if either source variable is missing.

1 = "Schools With More Affluent Than Disadvantaged Students", 2 = "Schools with Neither More Affluent nor More Disadvantaged Students", 3 = "Schools With More Disadvantaged Than Affluent Students"

Derived Variable Name: PCDG07HY

Variable Label: Total Instructional Hours per Year

Subject: P

Title of International Report Exhibit

Instructional Time Spent on Physics

Report Location

Physics 9.1

Procedure

Based on responses to the following questions in the School Questionnaire:

SCQ-07A: How many days per year is your school open for instruction? (PCBG07A)

(Open-response item)

SCQ-07B: What is the total instructional time, excluding breaks, in a typical day? (PCBG07B)

(Open-response item; response is in terms of minutes)

Derive PCDG07HY:

Step 1: Compute instructional hours per day:

Divide PCBG07B by 60.

Step 2: Compute hours of school per year:

Multiply the result of Step 1 by PCBG07A.

Set PCDG07HY to missing if either source variable is missing.



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