Data set metadata record

Data set ID
TIMSS 2003 Teacher Science

Data set title
Trends in International Mathematics and Science Study (TIMSS) 2003: Science teacher background questionnaire grade 8 (BTS) - South Africa as one of 50 countries

Citation

Data set description
This data set (Teacher science background questionnaire grade 8 - BTS) contains the responses the science teacher when asked questions referring to the background referring to their background, experience, subject taught and science curriculum topics. 265 Schools were sampled across South Africa and 10600 students (administered).

This data set has 239 cases and 228 variables.

Data set abstract
In November 2002, about 9000 grade 8 learners from South African public schools participated in the Trends in International Mathematics and Science Study (TIMSS). South Africa was one of 50 countries (and educational systems) that participated in this study. In TIMSS the students completed achievement tests in mathematics and science and answered questions on their home background, prior experiences and attitudes towards mathematics and science. Mathematics and science teachers completed questionnaires on, among other aspects, their preparation to teach, their teaching styles, professional development and attitudes towards science and mathematics. Principals completed questionnaires on school characteristics, parental involvement, grade 8 teaching and teachers of mathematics and science, student behaviour, resources and technology.

This data set Teacher science background questionnaire (btszafm3) contains the responses of teachers when asked questions referring to their background, experience, subject taught and science curriculum topics. The science subject teacher of the class sampled was required to complete this questionnaire.

Time method
Longitudinal

Time period
01 NOV 2002 - 31 JAN 2003

Origin
Primary data

Granularity
Micro level data

Type of data
Quantitative

Kind of data
Single tabular (Component of related data sets)

Production date
2002 Nov

Version
1.0

Countries
South Africa

Geographic coverage
International Study where South Africa was one of 50 Countries.

Geographic unit
All the provinces of South Africa.

Unit of analysis
Teachers in schools.

Universe - Included
Ministry of Education (School Register of Needs: 2000) database

Date of collection
01 NOV 2002 -

Mode of data collection
Self-completion

Sampling procedure
Ministry of Education (School Register of Needs: 2000) database served as the sampling frame. The TIMSS sampling design is a three-stage (TIMSS 2003 School Sampling Manual) stratified cluster design:

1. Selecting a sample of schools from all eligible schools;
2. Randomly selecting a mathematics and science class from each sampled school; and
3. Sampling learners within a sampled class in cases where the number of learners in a class in greater than 40.

The sample was explicitly stratified by two dimensions:
1. by province; and
2. by the language of teaching and learning which was English and Afrikaans in the case of South Africa (SRN 2000).

Weighting
Sampling Weights Included in the Student Data Files
Each student's sampling weight (TOTWGT) is a composite of six factors: three weighting factors corresponding to the stages of the sampling design (school, class, and student—WGTFAC1, WGTFAC2, and WGTFAC3), and three adjustment factors for non-participation at each of these stages WGTADJ1, WGTADJ2, and WGTADJ3, as described below. The variables described in this section are included in both the Student Background and Student Achievement files (see next chapter). The meaning and interpretation of the weights in each of these files is the same.

**WGTFAC1 School Weighting Factor**

This variable is the inverse of the probability of selection for the school where the student is enrolled.

**WGTADJ1 School Non-participation Adjustment**

This is an adjustment that is applied to WGTFAC1 to account for non-participating schools in the sample. Multiplying WGTFAC1 by WGTADJ1 gives the sampling weight for the school, adjusted for non-participation.

**WGTFAC2 Class Weighting Factor**

This is the inverse of the probability of selection of the classroom within the school.

**WGTADJ2 Classroom Non-participation Adjustment**

This is an adjustment that is applied to WGTFAC2 to account for non-participating classrooms or classrooms where student participation was less than 50 percent. Multiplying WGTFAC2 by WGTADJ2 gives the second-stage sampling weight, adjusted for non-participation.

**WGTFAC3 Student Weighting Factor**

This is the inverse of the probability of selection of an individual student within a sampled classroom. In the usual TIMSS case, where entire classrooms were sampled intact, the value was set to one for all students in the classroom. In a few countries, however, students were sampled within classrooms as a third sampling stage: in these cases the value of WGTFAC3 was greater than one.

**WGTADJ3 Student Weighting Adjustment**

This is an adjustment applied to the variable WGTFAC3 to account for non-participating students in the sampled classroom. Multiplying WGTFAC3 by WGTADJ3 gives the student-within-classroom sampling weight, adjusted for non-participation.

**TOTWGT Total Student Weight**

TOTWGT is obtained by multiplying the variables WGTFAC1, WGTADJ1, WGTFAC2, WGTADJ2, WGTFAC3, and WGTADJ3 for each student. The sum of these weights within a sample provides an estimate of the size of the population.

A key property of a sampling weight is that the same population estimates for means and proportions (although not the total or the number of units) will be obtained from any weighting variable that is proportional to the original weight (TOTWGT). For example, the sampling weights for a large country could be divided by a constant to make them smaller, and the weights of a smaller country could be multiplied by a constant to make them bigger. Regardless of which constant is used within a country, the weighted estimates of the means and proportions obtained from each of these proportional transformations of the weights will be exactly the same.
SENWGT Senate Weight

The SENWGT sampling weight is TOTWGT multiplied by 500 divided by the sum of the weights over all students in the target grade in each country. This results in a sample size of 500 in each country. SENWGT may be used in cross-country analyses in which each country should be treated equally. When SENWGT is used as the sampling weight for international estimates, the contribution of each country is the same, regardless of the size of the population.

HOUWGT House Weight

The HOUWGT sampling weight is TOTWGT multiplied by the ratio of the sample size (the number of students, \( n \)) in each country divided by the sum of the weights over all students in the target grade. HOUWGT may be used when the actual sample size is required for performing significance tests. Although some statistical computer software packages allow the sample size to be used as the divisor in the computation of standard errors, others will use the sum of the weights, which results in severely deflated standard errors for the statistics if TOTWGT is used as the weighting variable.

HOUWGT is the preferred sampling weight for analyses using such software. Because of the clustering effect in most TIMSS samples, it may also be desirable to apply a correction factor such as a design effect to the HOUWGT variable.

Weight Variables Included in the Student-Teacher Linkage Files

The individual student sampling weights generally should be used when you want to obtain estimates at the student level. The exception is when student and teacher data are to be analyzed together. In this case, a separate set of weights have been computed to account for the fact that a student could have more than one teacher. This set of weights is included in the Student-Teacher Linkage file and is listed below.

TCHWGT

This weight is computed by dividing the sampling weight for the student by the number of teachers that the student has. This weight should be used to obtain estimates regarding students and their teachers.

MATWGT

This weight is computed by dividing the sampling weight for the student by the number of mathematics teachers that the student has. This weight should be used to obtain estimates regarding students and their teachers.

SCIWGT

This weight is computed by dividing the sampling weight for the student by the number of science teachers that the student has. This weight should be used to obtain estimates regarding students and their teachers.

The Student-Teacher Linkage file also includes variables that indicate the number of teachers the student has.

Weight Variables Included in the School Data Files

As described earlier in this chapter, the schools in the TIMSS sample constituted the first stage of sampling and were chosen randomly. However, the school sample was designed to optimize the student sample rather than provide an optimal sample of schools, and is rather small in most countries - about 150 schools at each grade level.
SCHWGT School-level Weight

The school sampling weight SCHWGT is the inverse of the probability of selection of the school, multiplied by its corresponding non-participation adjustment factor. It is the product of WGTFAC1 and WGTADJ1.

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