Principles of Level Distinction for Student Accomplishment in TIMSS Tests (Trends in International Student Assessment)

In 1995 and 1999 percentiles were used as a basis for level appropriation. Advanced level was set at 90th percentile, high level at 75th percentile, intermediary level at 50th percentile and low level at 25th percentile. However, taking into account the fact that percentile value changes in different cycles, depending on country composition, permanent borderline values were introduced in 2003 for these levels: advanced was set at 625 points, high at 550 points, intermediary at 475 points, and low at 400 points.

Qualitative description of the four levels of Math proficiency for primary school students (TIMSS)

A special method (anchoring method) was used for qualitative description of learning achievement by students that demonstrate different levels of attainment—this method helped establish which assignments were successfully done by students who achieved certain levels of proficiency. To do that, results were brought together for students from all countries who have a certain level of attainment. Then knowledge and skills that students showed at a specific level were described in detail for each level. Generalized description was then formulated based on this detailed description. Content description for each level of student accomplishment that was created was drawn up taking into account the content of the test assignments which were successfully completed by the group of students whose level of attainment was on par with this level. The criteria for selecting assignments were as follows: they were set to be successfully completed by over 65% of students from the group in question as well as by under 50% of students from the lower level group.

Here is an example of content description for the four established levels of student accomplishment as it was introduced for mathematics when levels of attainment were established for Grade 4 students in the 2003 research.

1. Advanced level in mathematics is set for those achieving over 625 points. Students can apply their knowledge / comprehension to finding solutions for a wide circle of quite difficult situations. They demonstrate quite developed comprehension of simple and decimal fractions and of relationships between them. They can extract information that is necessary for solving a multistep textual problem in which proportional values are represented. They can on their own (unaided) create a rule for devising relationships between values or they can choose from what is available. They fully comprehend the concept of area and they can use measurement units as well as methods of calculating an area in order to solve problems that are presented. They show a certain comprehension of the concept of turning figures on the place and in space. They can organize, interpret and represent data that are needed for solving the problem that they were given.

2. High level in mathematics is set for those achieving between 625 and 550 points. Students can apply their knowledge / comprehension to finding solutions for given problems. They can solve multistep textual problems using addition, subtraction, multiplication and division. They can use their comprehension of the place-dependent number value in multiplace numbers as well as not too complex simple fractions for the purpose of solving given problems. They can extract numerical data that are characteristic for the situation presented in the problem. They show comprehension regarding spatial figures, breaking up figures into sections and using those sections to create new figures as well as simpler movement around the plane. They demonstrate a skill for conducting various measurements, and to solve given problems they can interpret and use data presented in table or graph form.

3. Intermediary level in mathematics is set for those achieving between 550 and 475 points. Students can apply their basic mathematical knowledge for non-complex (simple) situations. They can read, interpret and use various forms of presenting numbers. They can conduct operations with three- and four-digit numbers and with decimal fractions. They can continue non-complex numerical sequences. They are familiar with various two-dimensional figures. They can read and interpret the same data presented in various forms.

4. Low level in mathematics is set for those achieving between 475 and 400 points. Students have some basic knowledge. They demonstrate their comprehension of natural numbers and they can conduct simple operations with them. They are familiar with basic properties of triangles and rectangles. They can read off information that is presented in simple bar charts.