TSG 10
TEACHING AND LEARNING OF MEASUREMENT

The Organizing Team

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Measurement topics in this TSG include typical domains such as length, area, angle, volume, and mass but also those less studied, such as time, and those commonly visited in science and engineering education. Overall, internationally, there seems to be a lack of attention to measurement instruction in mathematics education, especially at the primary levels. This is in spite of measure's links to everyday contexts and to STEM disciplines. Although the historic role of measurement has dramatically decreased in some areas of mathematics, substantive informal mathematical knowledge is still based on measurement knowledge. Additionally, measurement is an area that connects with other mathematical topics including number and algebraic thinking. Moreover, it seems that weak knowledge related to measurement concepts and skills becomes problematic while studying other subjects.

The main objective of the TSG is to better understand the conditions and constraints on teaching and learning measurement in international contexts (from primary to university levels) and to consider some possible changes.

Several questions arise regarding this objective. They might be organized through five main subthemes related to the teaching and learning of measurement:

Connections between measurement and other mathematical topics. For instance, to what extent can measurement be used as a vehicle for connecting and linking other mathematical topics (such as number, operations, ratio, algebra, statistics, or geometry)? This also includes reports on insufficient knowledge in measurement that constitutes obstacles in learning other

mathematical subjects. Conversely, to what extent can other mathematical topics (number, operations, ratio, algebra, statistics, or geometry) support the development of measurement concepts in school? This also includes the use of problems such as geometrical construction to solve problems of measurement.

Connections between measurement and everyday life (including measurement at workplace). This can be related to the kind of knowledge on measurement that is required at workplace, knowledge on measurement students acquire out of school, as well as, for instance, forms of teachers' knowledge that support effective teaching,

How conceptual understanding of measurement of (geometrical) quantities develops. This subtheme also includes reports on teaching measurement and whether teaching supports or not conceptual understanding of measurement, as well as for instance the kind of mathematical theory that could support rich teaching of measurement,

Estimation of (geometrical) quantities. This notably includes how researchers, teachers, or curricula deal with estimation of quantities, as well as, for instance, the extent to which estimation nurture or not conceptual understanding of measurement.

Connections between math and STEM disciplines (or other school disciplines) through measurement. This subtheme includes examples of powerful connections. For instance, although measurement plays a core role in physics, conflicting situations between math and physics have been highlighted, and examples could be presented as well as ways to overcome conflicts.

The perspectives for each of these questions could be theoretical, methodological, historical, epistemological or empirical, and from various points of view such as teachers' practices, students' learning, as a mathematical subject, teacher education, curriculum, and so on.