

Statements of Aims and Focus for TSG34 at ICME-12

JULY 8-15, 2012, Coex, Seoul, Korea

Aims

The aims of TSG 34 at ICME-12 (The role of mathematical competitions and other challenging contexts in the teaching and learning of mathematics) are:

1. Gathering teachers, mathematicians, mathematics educators, researchers and other congress participants who are interested in mathematical competitions and other challenging contexts in the teaching and learning of mathematics at all levels.
2. Presenting research results and reporting on activities that will allow us to make an updated sketch of the state of the art, thus further developing the aims of the 16th ICMI Study, and colouring it in by addressing new trends and developments in research and practice in mathematics competitions and other challenging contexts and their effect on mathematics teaching and learning.

Expectations

The expectations for TSG34 are:

1. Reporting on the development of strategies and tools for incorporating challenging mathematics in schools and regular classes and on the way in which these are given direction by teachers, text books, educational systems and curricula, on extracurricular activities in schools (or by other contexts and aspects not listed here) as well as on research focusing on their impact,.
2. Reporting on challenges developed for implementation beyond the classroom such as journals, books, competitions at different levels, exhibitions, mathematics clubs, mathematics houses, lectures, camps, corresponding programs, mathematics days, fairs, family programs, as well as on research regarding the above items and similar tools.

3. Reporting on preparation programs for competitions and different types of recognition given to outstanding students and teachers.
4. Reporting on innovative competitions or other innovative mathematical challenges throughout the world.
5. Reporting on new activities and research on programs that provide mathematical challenge, with students as their main focus.
6. Reporting on the ways in which competitions and other challenging activities contribute to the motivation of students towards the study of mathematics.
7. Analysis of relationships between technological environments and challenging tasks, and of the impact of challenges focusing on students, classroom practice, assessment, as well as research addressing such analyses.
8. Analysis of ways of providing an enveloping challenging atmosphere for students to learn mathematical subjects and to be engaged in mathematical studies.
9. Follow up research on the discussions which took place at previous ICME's, especially DG19 at ICME-11 (<http://dg.icme11.org/tsg/show/20>).

In summary, all contributions relating to the state of the art of mathematical challenges, activities and their impact on bringing mathematical challenges to life, follow up studies and the results of studies on the impact of these activities on mathematics education are welcome.

Focus

TSG34 will focus on contributions giving answers to the following questions:

1. Do mathematical challenges better reflect the nature, the beauty and other characteristics of the corpus of elementary mathematics, as well as the experience of doing mathematics, than ordinary school mathematics? Does this make the mathematics involved more likely to engage the learners?

2. Does the widespread use of calculators and computers imply that mathematics education can only justify itself (aside: in as much as it prepares the learner to use a calculator or computer in an intelligent fashion) in as much as it is challenging, non-routine and cannot trivially be done on a calculator or computer, that is, in as much as it provides opportunities for all learners to be engaged in challenging mathematics?
3. How does this last question apply to in-service and future teachers? What are the needs and characteristics of teacher education with regard to challenging mathematics?
4. What are the implications for more challenging assessment in mathematics – both in and beyond the classroom?
5. Does the involvement of teachers in challenging contexts in and beyond the classroom affect the manner in which they teach mathematics?
6. Does the engagement of the learners in challenging contexts affect their learning ability in mathematics?

The group would also like to focus on contributions regarding recent research on the following items:

1. Research that can provide solid evidence of the impact of competitions on the student and on the educational system, as well as on the field of mathematics; research that provides a foundation for practice in a variety of ways;
2. Research showing the impact of competitions in attracting talented young students into the field of mathematics;
3. Research regarding the solidity of practice and the depth and extent of the impact of competitions;
4. Other important aspects that link competitions to research, for example, the original problems created for math competitions often correspond to new results that correspond to effectively doing research in elementary mathematics, and also new results in

research on the frontier of mathematics that can and have led to the formulation of original problems for the highest level competitions;

5. The designing, planning, organizing and carrying out of research relating to the nature of mathematical thinking and of how the experience of the average mathematics class can be brought closer to developing the mathematical thinking of students in ways that will be personally satisfying and fun, and enable the student to leave all options open when making life choices, from career to personal finance to exercising the rights of a citizen;
6. Research supporting the idea that all students can enjoy challenging and enriching experiences in mathematics;
7. Research that addresses the problem of how we must set our goals and build the possibility of their realization into our schools so that every child is given the chance to show his or her creativity within the confines of the mathematics classroom as well as he or she does beyond the classroom;
8. Research and experiences on how to transform pre-service and in-service teacher education, allowing teachers to experience the power and beauty of mathematics especially as it is embodied in challenges in that portion of elementary mathematics that forms the support for school mathematics.
9. Experience, projects and actions giving all children the opportunity to meet more challenging mathematics as an essential component of school mathematics, especially those experiences based on one of the four following premises: the rights of the student, the nature of mathematics itself, the way technology is changing the way we do mathematics – and indeed the way we think, and the needs of the knowledge-based society.
10. Experience and actions in those countries and school systems have long since made fundamental moves towards establishing a more challenging curriculum for all students. Many have built a rich mathematical culture for school mathematics. These traditions should be made known, analyzed and their strengths identified, so that others may benefit from their experience;

11. Experience and actions that develop the art of creating challenging tools by using ideas from the culture and heritage of society for enrichment of mathematics teaching and learning.

Furthermore, the organizing team of TSG34 encourages all contributors to submit their papers to the WFNMC journal for possible publication in a special issue.