TSG46 – Mathematical competitions and other challenging activities

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Description of TSG46

Introduction

The mathematics competitions movement emerged more than a century ago as a means to engage bright schoolchildren in mathematical activities that would be more challenging than activities traditionally included in regular mathematics curricula. There is overwhelming evidence that *all* students benefit from studying mathematics through challenging activities, though there are *some* students within every age cohort who require more mathematically advanced tasks than others do in order to be adequately challenged. In addition, it is well known that *many* students who enjoy feasible for them mathematical challenge, do not like to compete with other students. Hence, the joint focus of TSG46 is on mathematics competitions and other challenging activities, within or beyond a mathematics classroom.

TSG46 at ICMI14 builds upon the work of the previous ICMI-initiated forums, such as the 16th ICMI Study "Mathematical challenge in and beyond the classroom", DG16 at ICME10, DG19 at ICME11, TG34 at ICME12 and TG30 at ICME13. Discussions at these forums took different directions, but they all focused on aspects of a *mathematical challenge*.

Aims and focus

It needs to be acknowledged that the mathematical challenge is an elusive notion. ICMI Study 16 volume suggests the following conceptualization of challenge:

> "For the purpose of the Study, we will regard challenge as a question posed deliberately to entice its recipients to attempt its resolution while at the same time stretching their understanding and knowledge of some topic. Whether the question *is* a challenge depends on the background of the recipient; what may be a genuine puzzle for one person may be a mundane exercise or a matter of recall for another with more experience" (Barbeau & Taylor, 2009, p. 5).

This definition puts forward the expectations of the proposers of a challenge regarding actions of its (potential) recipients, but is rather silent about the recipient actual intentions and actions. Accordingly, the following queries are still open and require our attention as a community: Why and under which circumstances are our students inclined to accept or not the requests to invest intellectual effort in doing mathematical tasks with which we, their teachers, attempt to challenge them? What are characteristics of the mathematical tasks that have a chance to be perceived by the students as engaging and feasibly challenging? What is the role of a competitive aspect of a mathematical challenge? How can tasks that are initially designed for the use in competitions be used in a regular classroom or in a teacher preparation workshop? What are the relationships between engaging students in challenging activities and fostering their creativity and mathematical habits of mind? These and such queries will be at the heart of the discussions at TSG46.

As in the previous ICMEs, TSG46 at ICME14 is designed to gather mathematicians, teachers, mathematics educators and mathematics education researchers interested in mathematics competitions and other challenging activities. The aim of TSG46 is to create

a stage for high-level discussions enabling newcomers to get an overview of the state-of-the-art and provide a forum for experts to lead in-depth discussion on pertinent topics.

We invite contributions addressing (but not necessarily limited to) the following topics:

- Current advancements in IMO-driven national and international competitions and preparatory activities.
- Beyond IMO: Unconventional ideas and formats of mathematics competitions.
- How we help a student identified as talented from an inclusive competition (i.e. an open competition whose content is based on the school syllabus) on the pathway towards Olympiads.
- Beyond competitions: examples and theoretical analysis of challenging mathematical activities in in-school and out-of-school settings.
- Creating problems for the use in the competitions.
- The use of competition problems in mathematics education for regular students.
- Empirical research focusing on aspects of mathematics competitions and of other challenging activities.
- Involvement of mathematics teachers in the competition movement.
- Mathematics teachers as designers and facilitators of mathematically challenging activities for their students.
- Working with gifted students in preservice and in-service mathematics teacher education.

How to contribute?

Joining TSGs at ICMI14 as a presenting participant is a two-stage process. At the first stage, those wishing to join the study group are requested to submit a proposal of a paper or a poster addressing topics highlighted or others that make a significant contribution to the aims and focus of the group. The paper proposals are confined to four pages; the poster proposals are confined to one page. Templates for papers and posters must be used, and will be available at the official website of ICME-14. The proposal should be received between June 1 and September 15 2019, the sooner the better, both via e-mail to the group chair and through the on-line submission system at the Congress website. The proposals will be peer-reviewed.

At the second stage, the authors get the decision on acceptance, and some of the accepted proposals will be invited to extend to 8-page papers or rework their paper proposals as posters. The decisions and invitations will be issued no later than September 30 2019. The extended papers are to be submitted by December 29 2019. They will also be peer-reviewed, and there will be an opportunity to revise the full papers if needed. The final decisions will be issued by January 30 2020.

It is intended that sessions of the TSG46 will include, among other activities, regular presentations, short presentations and posters presentations.

References

Barbeau, E. J., & Taylor, P. J. (Eds.). (2009), *Challenging mathematics in and beyond the classroom*, *Study Volume of ICMI Study 16*. New York, NY: Springer.