

# Topic Study Group No. 49: In-Service Education and Professional Development of Primary Mathematics Teachers

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## The Program

Professional development is a never-ending pursuit for a teacher. This is why teacher and teacher educators are involved in the learning process throughout their entire professional lives. The complexity of mathematical teaching practices means in-service teachers face many challenges, such as the demands of new curricula, the introduction of new technologies in the classroom, and the adaptation of teaching practices for students with different abilities and in varying contexts. To address these challenges in each country's agenda for 21st century education, teachers' professional development should link the intended curriculum with students' success.

Topic Study Group (TSG) 49 discussed not only the experience and approaches of effective in-service teacher education and professional development of primary school mathematics teachers, but also contributed to building up a comprehensive overview of the state of the art, the impact of extended and lasting policies (e.g., accountability systems, standardized testing of educational outcomes, etc.), new categories and emphasis introduced by educational researchers (e.g., pedagogical

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content knowledge, mathematical knowledge for teaching, mathematical competencies, etc.), and current discussions on the available evidence for effective professional development programs and the need for related specific research.

To achieve this goal, researchers were invited to contribute to TSG 49. 50 papers were kindly submitted. The authors of 20 papers were invited to present at TSG 49s themed sessions. The authors of 16 papers were invited to present at the oral communication sessions. In addition, the authors of 14 papers were invited to present at the poster sessions. The following is a list of the papers presented at TSG 49s themed sessions and oral communication sessions:

### ***TSG Session 1: Lesson Studies***

- Clivaz, S., & Ní Shúilleabháin, A. Developing Mathematical Knowledge for Teaching in Lesson Study: Propositions for a Theoretical Framework.
- Fujii, T. Lesson Planning in Japanese Elementary School Lesson Study.
- Takahashi, A. Collaborative Lesson Research (CLR).

### ***TSG Session 2: Developing Models of Efficient In-Service Teacher Training***

- Cobbs, G. A., Chamblee, G., Luebeck, J. Enhancing In-Service Elementary Mathematics Teachers' Content Knowledge: A Discussion of Two U.S. MSP Projects.
- Kimmins, D., Huang, R., Winters, J., Hartland, K. In-Service Teachers' Perceptions and Interpretations of a Learning Trajectory: Division of Fractions.
- Loh, M. Y., & Seto, C. Mentoring and Mathematics Teacher Noticing: Enhancing Teacher Knowledge.
- Panorkou, N., & Kobrin, J. L. Enhancing Teachers' Formative Assessment Practices: Using Learning Trajectories in Professional Development.
- Peri, A., Espinoza, C. G., Darragh, L. Questions and Quality of Classroom Instruction of Math After a Professional Development.
- Venkat, H., Askew, M., Abdulhamid, L., Morrison, S., Ramatlapana, K. A Mediation Approach to Expanding In-Service Primary Teachers' Mathematical Discourse in Instruction.

### ***TSG Session 3: New Relations and Partnership Experiences in Teachers' Professional Development***

- Ader, E. Investigating Classroom Teachers' Development of Quality of Implementation of Mathematical Tasks.

- Amador, J. M., Bennett, C. A., Avila, C. Understanding Rural Teachers' Perceived Needs and Challenges in Creating Rich Learning Environments.
- Glanfield, F. A., Mgombelo, J., Simmt, E., Binde, A. Primary Mathematics Teacher Development in Rural Communities: Lessons Learned From an International Research Partnership.
- Guiñez, F., & Martínez, S. A B-Learning Approach to Developing Mathematical Knowledge for Teaching for In-Service Primary School Teachers.
- Martínez, M. V., & Varas, L. Identifying Elements of Teachers' Change in a Professional Development Experience.
- Martinez, S., & Varas, L. On The Development of a Collaborative Partnership Model Involving In-Service Teachers and Researchers.
- Nutov, L., & Sriki, A. Teacher and Students as a Collaborative Inquiry Learning Community: A Means for Teachers' Professional Development.

### ***TSG Session 4: Scaling Up Sustainable Interventions***

- Kristinsdóttir, J.V. Co-Learning Partnership in Mathematics Teacher In-Service Education.
- Morgan, D. Teaching For Mastery: A Strategy for Improving Attainment in Mathematics in English Primary Schools.
- Schliemann, A. D., Carraher, D. W., Teixidor i Bigas, M. Teacher Development and Student Learning.
- Selter, C. The Pikas Project—Using Knowledge Gained From Implementation, School Development & In-Service Teacher Training Research.

### ***Oral Communication Session 1***

- Kaplan, H. A., & Argun, Z. Knowledge for Diagnosing Student Thinking: How it Affects Diagnostic Competence?
- McCoy, L. J. An Experiential Learning Approach to Developing In-Service Elementary Teachers' Content Knowledge for Teaching Mathematics.
- Putra, Z. H., Evaluation of Elementary Teachers' Knowledge on Fraction Multiplication Using Anthropological Theory of the Didactic.
- Wang, D. Probing Into the Ways Teachers Learn Mathematics and its Teaching.

### ***Oral Communication Session 2***

- Abdullah, N. A., & Leung, F. Highlighting Teacher's Values in Teaching Primary School Mathematics During Lesson Study Process.
- Hlam, T. L. A Teacher Collective as a Professional Development Approach to Promote Foundation Phase Mathematics Teaching.

- Shanmugam, K., Lim, C. S., Razhi, M. Insights of Lesson Study Process From Malaysian Mathematics Teachers: A Case Study.
- Strom, A. D., Kimani, P., Watkins, L. Amping Up Professional Development Through a Collaborative Community of Learners (CCOL).

### *Oral Communication Session 3*

- Eichholz, L. “Mathe Kompakt”—Design and Evaluation of an In-Service Course for Out-Of-Field Mathematic Teachers.
- Dogbey, J. Reforming Elementary School Mathematics Instruction Through Classroom Discourse and Cooperative Learning.
- Pasquali, G. G. The Impact of the Mathematic Olympiads in Paraguayan Teachers.
- Swai, C. Z., & Binde, A. L. A Study of Primary School Teachers’ Beliefs of Pedagogical Strategies in Mathematics Lessons in Tanzania.

### *Oral Communication Session 4*

- Husband, M., Rapke, T., Ruttenberg-Rozen, R. “Yes, And ...”: Conceptualizing and Characterizing Authority as Fluid in Professional Learning Communities.
- Justo, J. C. R., Da Silva Rebelo, K., Borga, M. F., Dos Santos, J. F., Echeveste, S. S. In-Service Education of Primary Mathematics Teachers With Focus on Problem Solving.
- Karunakaran, M. S., Adams, A. E., Wnek, B., Blackham, V., Klosterman, P., Knott, L., Ely, R. Making Mathematical Reasoning Explicit: Responsive PD.
- Quiroz Rivera, S., Castañeda, E., Rodríguez, R. Less Theory and More Practice: How to Design a Lesson Based in Mathematical Modeling?
- Based on the above paper presentations during the ICME-13, TSG 49, we had a fruitful discussion about important issues for effective in-service professional development for primary mathematics teachers. Although the sessions were filled with innovative ideas, the discussion did not end with a consensus on what would be the essentials to make a vital impact on both student learning and teacher development in the field of mathematics. We are all looking forward to continue our discussion to improve the quality of in-service professional development programs.

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