

TSG Agenda

TSG 36: Research on classroom practice at primary level (number and title)

Class: B (Class A for TSGs with odd numbers; Class B for TSGs with even numbers)

**Please prioritize the sessions in “core-time” (from 19:30-23:00, Beijing time, i.e. Session 2, 3 for Class A and session 1, 2 for Class B) as they are friendly to most of the time zones in the world.

Session 1 (19:30 - 21:00)

1. Time: 19:30–20:00

Title of the Paper:

The Benefits of Using Videos From Research Studies for Teacher Education: Attending to Students’ Reasoning and Argumentation

Author(s):

Carolyn A. Maher

Institution(s) (to school/department/research center) and Country/Region:

Rutgers University, US

Short abstract of the paper (20 lines maximum):

More than two decades of research on children’s mathematical learning has produced a unique collection of videos and video narratives revealing primary-school children’s problem solving, reasoning, and engagement in building convincing arguments for solutions to mathematics problems. The videos from these earlier studies are available, open source, on the Video Mosaic Collaborative (www.videomosaic.org) and have become a central tool in the design and implementation of teacher-education and development interventions that have as a goal teacher recognition of children’s reasoning. The videos are a central component in the design of the Intervention Model for Teacher Education, revealing how children represent, build, share, connect, and communicate their knowledge during problem solving, Results from these teacher-

education studies utilizing the model show significant effects in the growth in teachers' recognition of children's reasoning as a result of the intervention, as demonstrated by pre and post assessments.

2. Time: 20:00—20:15

Title of the Paper:

Examining U.S. Elementary Teachers' Perceptions of and Comfort with Students' Mathematical Mistakes

Author(s):

Jinqing Liu, Dionne Cross Francis, and Ayfer Eker

Institution(s) (to school/department/research center) and Country/Region :

Indiana University; University of North Carolina; Giresun University

Short abstract of the paper (20 lines maximum):

This study examines teachers' perceptions of students' mathematical mistakes and their comfort levels in addressing those mistakes during instruction. Seven elementary teachers were interviewed. The results showed that teachers believed mistakes are important for "proactively teaching", essential for supporting student learning as well as for lesson planning. However, teachers expressed that they did not feel very comfortable in addressing student mistakes. The factors that appeared to contribute to their low comfort levels were fighting against the instinct to correct the mistakes for students, concerns about students' negative emotional reaction, and low efficacy regarding addressing student mistakes.

3. Time: 20:15—20:30

Title of the Paper:

Problems with variation: an educational experience of cultural transposition with prospective PRIMARY teachers

Author(s):

Benedetto Di Paola

Institution(s) (to school/department/research center) and Country/Region :

Università degli Studi di Palermo, Italy

Short abstract of the paper (20 lines maximum):

The paper presents some theoretical reflections and some methodological notes about a Professional Development (PD) path worked out during the last two years by Italian researchers for prospective Primary teachers. The theoretical construct of Cultural Transposition defines the framework of the PD path's activities and the related research. It was used to define an interesting cultural lens to delineate possible new approaches for effective pre-service teacher education programs, in particular for the Primary level. The defined methodology was based on the possibility to reflect about the decentralization of didactic practices based on a specific cultural context through one or more contacts with other "realities" coming out from different selected cultural contexts. In the last section of the paper we argue that the contact with a different didactic perspective coming from the Chinese "problems with variation" (one of the stimuli proposed in the PD' path), encouraged some reflections by the Italian pre-service teachers on the use of "variation" in Math word-problems for an early approach to Algebra in Primary level.

4. Time: 20:30—20:40

Title of the Paper:

Shanghai Practice of Primary Mathematics Classroom Activities

Author(s):

Min Zhang

Institution(s) (to school/department/research center) and Country/Region:

Teaching Research Section of Shanghai Municipal Education Commission

Short abstract of the paper (20 lines maximum):

Since the implementation of "the second stage of curriculum reform" in Shanghai, mathematics teaching in primary schools has followed the "student development-oriented" curriculum concept. According to the cognitive characteristics of students,

taking the design and implementation of mathematics classroom activities as a breakthrough, combined with the teaching content to carry out three types of classroom activities: “perceived experience”, “exploration and discovery” and “understanding and application”. Teachers gradually form the following implementation points in practice: Combine operational experience with technical application to enhance student understanding; focus on the development of all students, teach students in accordance with their aptitude; Optimize traditional teaching experience and value students’ experience. Through classroom activities, teachers stimulate students’ desire for inquiry, enhance students’ participation, improve students’ learning styles, and realize Mathematics Subject’s multiple-quality function and advantages in fostering qualified personals.

5. Time: 20:40—21:00: Open Discussion

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Session 2 (21:30 - 23:00)

1. Time: 21:30—22:00

Title of the Paper:

Conjecturing Teaching as competency-based Instruction

Author(s):

Pi-Jen Lin

Institution(s) (to school/department/research center) and Country/Region:

National Tsing-Hua University, Taiwan

Short abstract of the paper (20 lines maximum):

Mathematical competency, as the focus of currently mathematical curricular reform across countries is expected to be achieved in the classrooms. School teachers are looking for what the competency-based classrooms look like and what the instructional approach could be. This paper introduces an instructional approach of competence-based, termed as conjecturing teaching model with five stages. The conjecturing teaching model has been developed since 2011. The development of the model was characterized into six periods of investigation. Each period had a focus

for eliciting the model. It has been disseminated by four teacher professional communities ($1+X_i$ communities, $i=1,2,3,4$) since 2018. The model was able to initiate argumentation, as one aspect of the mathematical competency displayed in the classrooms were briefly described in the paper.

2. Time: 22:00—22:15

Title of the Paper:

How does a Japanese Primary School Teacher Manage the Whole-Class Discussion Named Neriage?

Author(s):

Valérie Batteau

Institution(s) (to school/department/research center) and Country/Region:

HEP Lausanne, Switzerland

Short abstract of the paper (20 lines maximum):

This research aims at analyzing teacher practices in a Japanese context with a focus on a specific phase of structured problem solving lessons, a whole-class discussion named neriage. We analyze teacher practices with the specific tools of the double didactical and ergonomical approach: the cognitive component of practices that concerns the organization of the tasks for the students and the mediative component of practices that concerns the interactions of the teacher with the students. The data are collected in a research lesson in a Japanese Lesson Study about the logical thinking, and in the collective meetings before and after the research lesson. This research highlights a key element in the teacher's practices that can explain both the choice of tasks and how the teacher manages the neriage: the variation of the values of the didactical variables of the task.

3. Time: 22:15—22:25

Title of the Paper:

Teaching mathematics at Mexican elementary schools

Author(s):

Edith Arévalo Vázquez, Hilda Alicia Guzmán Elizondo, and Elvira Alicia Sánchez Díaz

Institution(s) (to school/department/research center) and Country/Region:

Escuela Normal Miguel F. Martínez, Mexiko

Short abstract of the paper (20 lines maximum):

The present study offers results about the ways of teaching mathematics in groups of fifth and sixth grade of public elementary schools in Mexico, located in the state of Nuevo León. The objective was to assess the practices of 70 elementary school teachers, in accordance with the application of the didactic approach suggested from the current syllabus (2011) in mathematics classes. It is a study of descriptive scope. For the information retrieval, an observation guide was used, based on the current curriculum for basic education. Teaching strategies, forms of class organization, classroom organization, use of teaching materials, assessment tools and textbook, among others, were the categories taken into account. The results show that despite the implementation of the current curriculum, most educators continue to use teaching strategies that are far from the suggested didactic recommendations. The textbook is the resource used par excellence and the forms of classroom organization are preferably by working individually and as a group. Those practices keep showing not very encouraging results at national and international levels.

4. Time: 22:25—22:35

Title of the Paper:

Action-research group on Go game as classroom practice to learn mathematics at primary level

Author(s):

Antoine Fenech and Richard Cabassut

Institution(s) (to school/department/research center) and Country/Region:

IREM de Strasbourg, Strasbourg University, France

Short abstract of the paper (20 lines maximum):

First let us introduce shortly the game of Go. It is a strategy game for two players; one player has the black stones and the other one the white ones. One player takes his turn to place one stone on a vacant point of intersection of the board. The stones are not moved.

This player captures a stone or group of stones of the other colour when they are surrounded by his stones on all orthogonally adjacent points. At the end of the game, the winner is the player who has the greatest number of stones on the board. We adopted the variations of the rules of the Game suggested by the Strasbourg Go Club (Strasgo 2019).

5. Time: 22:35—22:45

Title of the Paper:

A Grade 2 Teacher’s Shift in the Use of Mediatlional Means Within and Across two Addition Lessons

Author(s):

Fraser Gobede

Institution(s) (to school/department/research center) and Country/Region:

University of Malawi

Short abstract of the paper (20 lines maximum):

This paper discusses mediational moves made by a grade 2 teacher while teaching the addition of whole numbers for the first time at this level. The main focus is on the shifts made by the teacher within and across two lessons in the way she worked with example spaces, artifacts, inscriptions, and explanations. The Mediating Primary Mathematics framework was used both as the theoretical and analytical framework guiding the study. The teacher helped learners to progressively move from physical representations to written inscriptions of mathematical concepts and processes. After a successful transition from the use of artifacts and inscriptions to mathematical talk, the findings suggest the need to move further to more efficient calculation strategies.

6. Time: 20:45—21:00: Open Discussion

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Session 3 (14:30 - 16:30)

1. Time: 14:30—14:45

Title of the Paper:

Using Math Clinic to Support Classroom Teaching Practice and Sharpen Teachers’ Pedagogical Content Knowledge

Author(s):

Shuhua An

Institution(s) (to school/department/research center) and Country/Region:

California State University, Long Beach

Short abstract of the paper (20 lines maximum):

The purpose of this project was to study the impact of using math clinic approach on elementary teachers' classroom practice and their pedagogical content knowledge (PCK). Specifically, this project examined the impact of math clinic on classroom teachers' questioning strategies, understanding students' thinking and misconceptions in common core standards and their intervention strategies of correcting errors. A cohort of US classroom teachers participated in the summer math clinic. The data collection included the lesson plans for math clinic, videos of case study on student thinking, report of math clinic, children's progress monitoring charts, and pre- and post-questionnaires for the teachers. The results show that teachers improved their teaching practice on designing probing questions, analyzing and using student misconceptions, and their PCK.

2. Time: 14:45—15:00

Title of the Paper:

How Might Reasoning Question and Answer Prompts Impact Learners Mathematical Thinking?

Author(s):

Kirsty Jane Watson

Institution(s) (to school/department/research center) and Country/Region:

University of Northampton

Short abstract of the paper (20 lines maximum):

This research study sought to investigate how reasoning questions and answer prompts might impact learners' mathematical thinking. This project took place in an outstanding four-form entry primary school with a catchment area that reflected the UK national average in learner backgrounds. The research question was chosen to contribute to the achievement of the reasoning aims in the school's development plan. The research was implemented within Year 4 (8-9 year-old learners) and was initiated within a weekly planning meeting; this led to further group planning meetings throughout the research. Quantitative data was collected in the form of learner reasoning assessments, whilst

qualitative data was collected via a book analysis of the learners' exercise books. It was decided that the resources created for this project would remain in place due to the success across the school with regards to reasoning; this was evidenced in the school review which took place after the project data were collected.

3. Time: 15:00—15:10

Title of the Paper:

Data Use to Inform Mathematics Instruction: An Exploratory Study

Author(s):

Jong Cherng Meei

Institution(s) (to school/department/research center) and Country/Region:

Institute of Teacher Education Penang Campus, Malaysia

Short abstract of the paper (20 lines maximum):

This study investigates the state of data use to inform instruction among primary school mathematics teachers in Malaysia. It looks at the type of data these teachers use to inform their mathematics instruction, their predominant level of data literacy, their training needs and support in data use, and their confidence in using data. 88 teachers responded to a questionnaire and five of them were subsequently interviewed. Results of the questionnaire and interviews indicate that the data which was most frequently used was classroom-based assessment data. The predominant data literacy level of the teachers involved collecting, analysing and interpreting data, and hence indicating actions and communication based on the data were less emphasized. The teachers were generally of the perception that the training needs and support for data use were adequate and they were confident in using data to inform mathematics instruction. However, they were also of the opinion that more professional development courses should be conducted for them so that they can use data effectively and systematically to inform their practice.

4. Time: 15:10—15:20

Title of the Paper:

Concept of Collective Milieu to Understand the Japanese Mathematics Lesson

Author(s):

Takeshi Miyakawa, Valérie Batteau, and Minbom Ryu

Institution(s) (to school/department/research center) and Country/Region:

Waseda University, Japan; HEP Lausanne, Switzerland; Joetsu Univ. of Education, Japan

Short abstract of the paper (20 lines maximum):

Our research is motivated by a lack of theoretical tools to analyse the Japanese mathematics lessons with their specificities: the approach by problem solving, the collective dimension of the teaching, and the focus on the development of mathematical thinking. We introduce the concept of collective milieu in order to take into account the collective dimension of the teaching, the lesson as a whole, and the epistemological dimension of the lesson. This research highlights a collective construction of the inquiry or the problem solving process step by step, in terms of the collective milieu.

5. Time: 15:20—15:30

Title of the Paper:

Exploring the Differences between Expert and Pre-Service Teachers Noticing

Author(s):

1. Yiru Pei, 2. Min Chen, and 3. Qiaoping Zhang

Institution(s) (to school/department/research center) and Country/Region:

1. The Education University of Hong Kong, Hong Kong, SAR, China
2. College of Teacher Education, East China Normal University, Shanghai, China
3. The Education University of Hong Kong, Hong Kong, SAR, China

Short abstract of the paper (20 lines maximum):

Teacher noticing is regarded as a desirable ability in mathematics teachers' expertise in teaching. This study examines the noticing ability among expert teachers and explores the difference and similarities between expert teachers and pre-service teacher's noticing on exemplary lessons. Using Learning to Notice framework, a multiple case study was adopted to analyze three teachers' noticing on two pre-recorded exemplary lessons. Findings showed that the pre-service teacher has a relatively low noticing ability and tend to focus on the pedagogy and classroom environment. Expert teachers focused more on students'

thinking but showed diverse noticing abilities. A possible suitable framework to study Chinese mathematics teachers' noticing is also discussed.

6. Time: 15:30—15:40

Title of the Paper:

From loser to user, from special to general education, learning Inside mathematics through outside actions

Author(s):

Allan Tarp

Institution(s) (to school/department/research center) and Country/Region:

MATHeCADEMY.net, Denmark

Short abstract of the paper (20 lines maximum):

Although eager to begin school, some children soon fall behind and are sent to special education teaching the same at a slower pace. Wanting mathematics education to be for all leads to the question: Is this so by nature or by choice? Can it be otherwise?

Observing how children communicate about Many before school, this paper asks what kind of mathematics can be learned if accepting the bundle-numbers as 2 3s that children bring to school. Using Difference Research, it turns out that accepting numbers with units means that counting, recounting and solving equations come before adding on-top or next-to introduce integral and differential calculus as well as proportionality in early childhood education. So, it is possible to institute an ethical mathematics education that transforms loser to users returning to general education as stars teaching fellow students and teachers how to master Many.

7. Time: 15:40—15:50

Title of the Paper:

Storytelling as a resource for fostering 'love of challenge' for mathematics in primary grade students

Author(s):

Pooja Keshavan Singh & Haneet Gandhi

Institution(s) (to school/department/research center) and Country/Region:

University of Delhi

Short abstract of the paper (20 lines maximum):

In this study, storytelling has been used as a pedagogic resource to teach skip counting to 22 Grade II students studying in a government school of Delhi, India. The study looks at the cognitive engagement of the selected students with a mathematical content that was embedded in the story situation. It was observed that the attachment of the students with the story characters motivated them to go beyond the basic requirements of the task, thereby, seeking challenges and expanding their vistas for more complex tasks. The study recommends storytelling as a resource for fostering a 'love of challenge' for doing mathematics with primary grade students.

8. Time: 15:50 – 16:10

Open Discussion

9. Time: 16:10 – 16:30

Closing Discussion

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