13th International Congress on Mathematical Education (ICME-13)
24 – 31 July 2016 in Hamburg

Final Programme
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Welcome to ICME-13

The Society of Didactics of Mathematics (Gesellschaft für Didaktik der Mathematik – GDM) has the pleasure of hosting ICME-13 in 2016 in Germany. The congress – to be held under the auspices of the International Commission on Mathematical Instruction (ICMI) – takes place at the University of Hamburg from Sunday, 24th July to Sunday, 31st July 2016. Hamburg is a bustling cosmopolitan port in the north of Germany, and with 1.8 million inhabitants its second largest city. It offers a perfect environment for a challenging congress.

We invite participants from all over the world to come to Hamburg and make ICME-13 a rich experience for all. ICME-3 took place in Germany in 1976 in Karlsruhe, and we are proud to welcome mathematics educators from all over the world back to Germany. The congress attendees will experience the very special characteristics of the German mathematics education discussion, which is closely connected to European traditions of didactics of mathematics and has seen important recent developments.

The Society of Didactics of Mathematics represents the German speaking community of didactics of mathematics, bringing together mathematics education groups from Germany, Austria and Switzerland. Supported by the German Mathematical Society, the German Educational Research Association and the German Association for the Advancement of Mathematics and Science Education we are eager to welcome ICME-13 participants to Germany. The congress is hosted by the University of Hamburg supporting ICME-13 strongly since the very beginning. The University of Hamburg deserves our special thanks.

Gabriele Kaiser
University of Hamburg
Convenor of ICME-13

Rudolf vom Hofe
President of the Society of Didactics of Mathematics
COMMITTEES OF ICME-13

International Programme Committee (IPC)

- Gabriele Kaiser (Germany) – Chair of IPC and Convenor ICME-13
- Abraham Arcavi (Israel) – Secretary General of ICMI
- Ferdinando Arzarello (Italy) – President of ICMI
- Kiril Bankov (Bulgaria)
- Rute Borba (Brazil)
- George Ekoé (Uganda)
- Helen Forgasz (Australia)
- Mellony Graven (South Africa)
- Alain Kuzniak (France)
- Hee-Chan Lew (Korea)
- Johnny Lott (USA)
- Marianne Nolte (Germany) – Chair of Local Organising Committee ICME-13
- Jarmila Novotna (Czech Republic)
- Birgit Pepin (The Netherlands)
- Susanne Prediger (Germany)
- Elaine Simmt (Canada)
- John Toland (Great Britain) – Representative of IMU
- Kalifa Traoré (Burkina Faso)
- Behiye Ubuz (Turkey)
- Monica Ester Villarreal (Argentina)
- Binyan Xu (China)
- Senior Advisor: Mogens Niss (Denmark)

Local Organising Committee (LOC)

- Convenor: Gabriele Kaiser (University of Hamburg)
- Chair of the LOC: Marianne Nolte (University of Hamburg)
- Angelika Bikner-Ahsbahs (University of Bremen)
- Dagmar Bönig (University of Bremen)
- Nils Buchholtz (University of Hamburg)
- Aiso Heinze (IPN at CAU University Kiel)
- Christine Knipping (University of Bremen)
- Ulrich Kortenkamp (University of Potsdam)
- Günter Krauthausen (University of Hamburg)
- Dominik Leiß (Leuphana University Lüneburg)
- Anke Lindmeier (IPN at CAU University Kiel)
- Michael Neubrand (Carl Ossietzky University Oldenburg)
- David Reid (University of Bremen)
- Silke Ruwisch (Leuphana University Lüneburg)
- Marcus Schütte (TU Dresden / University of Hamburg)
- Björn Schwarz (University of Hamburg)
- Jens Struckmeier (University of Hamburg, Department of Mathematics)
- Maike Vollstedt (University of Bremen)
- Katrin Vorhölder (University of Hamburg)
Congress Information / Overview

Date: 24th to 31st July 2016
Venue: University of Hamburg, Congress Center / CCH, City of Hamburg, Germany
Host: GDM, University of Hamburg, ICMI
Official language: English

Facts and figures:
- 3750 Scholars participate (plus 360 accompanying persons) from 106 countries
- 220 People are getting financial support from the solidarity grant
- 240 German teachers are attending supplementary activities
- 450 Scholars are taking part in the pre-congress Early Career Researcher Day
- 2 Plenary panels and 4 Plenary speakers are presenting their work
- 5 ICMI awardees are presenting their work
- 5 Survey teams are discussing their results
- 3 ICMI studies present their work
- 6 National presentations are displayed
- 61 Invited lectures are held
- 24 scholars are preparing the activities for the thematic afternoon
- 42 Workshops and 38 Discussion groups are designated
- 1952 Papers and 530 Posters have been reviewed and accepted
- 26 ICME-13 Topical Surveys are published “open access” until the congress
- More than 30 post-congress monographs are expected from the TSGs and other activities apart from the congress proceedings

Supporters:
- Federal Ministry of Science, Research and Equality (BWFG)
- Federal Ministry of Education and Research (BMBF)
- German Mathematical Society (DMV)
- German Educational Research Association (DGfE)
- German Association for the Advancement of Mathematics & Science Education (MNU)
- DZLM
- Deutsche Telekom Stiftung / German Telekom Foundation
- German Research Society (DFG)
- Robert-Bosch-Stiftung / Robert-Bosch-Foundation
- Springer International Publishing
- Casio
- HP
- Texas Instruments
- T3 Deutschland
- Hamburg Convention Bureau

Convenor: Gabriele Kaiser, VZD-ICME-13 e.V.
c/o University of Hamburg, Faculty of Education, Von-Melle-Park 8, 20146 Hamburg
convenor.icme13@uni-hamburg.de

VZD-ICME-13 e.V.:
- Association for ICME-13 (Non-profit institution)
  Christine Bescherer (PH Ludwigshburg University of Education)
  Angelika Bikner-Ahsbahs (University of Bremen)
  Rudolf vom Hofe (University of Bielefeld, President of the Society of Didactics of Mathematics)
  Gabriele Kaiser (University of Hamburg)
  Günter Krauthausen (University of Hamburg)
  Marianne Nolte (University of Hamburg)
  Silke Ruwisch (Leuphana University Lüneburg, Vice President of the Society of Didactics of Mathematics)
  Rudolf Sträßer (University of Gießen)
  Hans-Georg Weigand (University of Würzburg)
### General Information

**Location:** A: grey, Congress Center / CCH, foyer

Opening hours of the Congress Office with Congress Registration:

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<tr>
<th>Day</th>
<th>Date</th>
<th>Registration / Helpdesk</th>
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<td>Sunday</td>
<td>24 July 2016</td>
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<td>Cloak Room</td>
<td>08.00 – 15.00</td>
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**Printed Congress-Programme**

Due to the high number of submissions the programme does not contain abstracts of single presentations. The programme with all abstracts is available via [www.icme13.org](http://www.icme13.org) or via your personal account in Conftool. Using your personal account you can access all papers and posters assigned to your TSG via the gallery function.
Help and Support

On the second sheet in your congress badge holder you will find emergency telephone numbers for exclusive usage in high emergency situations. We have helpdesks at the Congress Center / CCH and at the Auditorium Maximum and a lot of friendly ICME-13-team-members on the Campus. In cases of “lost and found” please contact our help-desk in the Congress Center / CCH.

Exhibitions

There are exhibitions of institutions and commercial providers: You will find in the East Wing Building (B: dark-brown) Casio, Texas Instrument, Mintfit BWFG, T3 Deutschland, ICMI-IMU, Mathematical Association GB, Austral. Assoc. of Mathematics Teachers. In the West Wing Building (D: Yellow) you will find Springer Internat. Publishing, HP, NCTM, CFEM, DZLM, Sense Publisher. In the Auditorium Maximum (Building J: red) there are MNU, DMV and the ICME-14 team.

ICME-13 Excursions

At Thursday, 28 July 2016 there is a rich variety of 21 different excursions for congress participants and accompanying persons. Please check in time, which excursion you have selected and when and where it starts. You will find pillars with a leaflet for every excursion with the necessary info in the foyer of the Congress Center / CCH. Please be at the starting point of your excursion in time. Please note that departure times of the different excursions are varying. In every bus and on every boat you will find one person as host from the GDM (German Society for Didactics of Mathematics) and an ICME-13-Team-member.

Accuracy

Please be aware, that in Germany we are planning with precise times – and e.g. a bus at the excursion will perhaps wait 5 to 6 minutes for missing persons, but certainly not longer. So please be at the right place at the right time and plan your way with an adequate time buffer.

Internet

Due to the very strict German Copyright Laws the free Internet is not as open as in other parts of the world. Hotspot-providers in Germany are responsible for downloads via their hotspots, i.e. for misuses of copyright regulations of texts, pictures, videos, Spams etc. These laws have just been changed to an “open world”, but for our congress it is too late to get more user-friendly conditions. So we can only offer you a less comfortable workflow with individual log-ins. At the Congress Center / CCH an individual code for access to the hotspot of the Congress Center / CCH will be sent via text message to every participant of ICME-13. When arriving there, your electronical devices will find the net “WiFi_SMS_CCH” and ask you for your personal code. Please enter the code “cchwlan1602” and follow the instructions. You will receive a new code via text message, which is valid maximally 24 hours and is expiring at midnight. If you do not have a mobile phone connection, please ask the technical Help-Desk in the foyer for assistance. At the University of Hamburg the situation is similar. We are offering you a personalised code for the University Internet, which you will find in your congress material. This code is valid for your whole stay until 31 July 2016 and functions at the whole Campus. In your accommodation, normally you will have free access to the Internet. There are several free hotspots in the city, often for free for 30 minutes; after this money is charged.
Safety

Hamburg with its 1.8 mill inhabitants from 190 nations is a safe city, but we also have areas and places, where thieves might look for your billfold or handbag. Please be careful especially at crowded places and at the red-light and club-district, the so-called Reeperbahn. Especially at these places a friendly offer for a free beer in a nightclub may become very expensive.

Banks and ATM

There are a lot of bank branches (opening times normally Mo. – Fr. between 09.00 and 18.00) around the Campus and thousands of ATM in the whole city.

Electricity

The power supply in Germany is 220 volts.

Medical Service

Hamburg has a huge number of hospitals and medical services for every disease; in case of emergency cases the doctor will reach you in 8–10 minutes. The rescue ambulance has the telephone number 112. There is also a First-Aid-team on the Campus during the Congress – if you have serious health problems, ask a ICME-13 team member with a blue or yellow vest for help.

Meals and Refreshments

The University Mensa (Canteen) offers you several meals for lunch every day – just follow the signs MENSA. The quarter around the University Campus offers many supermarkets, bakeries, cafeterias and restaurants with food to reasonable prices. An American burger fast food restaurant can be found at the station Dammtor, close to the Congress Center / CCH. In our little city map of the Campus with neighbourhood we have marked the streets with the most gastronomic offers close to the University with short walking times. For the higher gastronomic level there are restaurants in the Hotel Radisson at the Congress Center / CCH or at the Elysee at the backside of the University Main Building. And, of course for dinner, thousands of restaurants with kitchen from more than 130 nations are waiting for you, located all over Hamburg.

Public Traffic

Your congress badge shows a printed little sign, which allows you to use the complete public transport system of the city of Hamburg for free (including busses, harbour ferries, overground traffic (S-Bahn) and underground traffic (U-Bahn)). The ticket is valid for the congress time, i.e. from 24 – 31 July 2016. Public transport stops their business around 00.30 in the night and starts again at about 04.00, night-busses are running. At the weekend from Friday to Sunday the trains are running through the whole night.

You can find your connections via http://www.hvv.de/en

Please note that this agreement with HVV does not include a train ride to other cities with the German Train DB! It is just valid for the area of the City of Hamburg.

See maps on the next pages for Metro Buses and Rapid Transit / Regional Rail.
General Information

MetroBusse / Metro Buses

hv.de 040/19 449

Information • Fahrpläne | Timetables • Service

Stand / Date of issue: 13.12.2015
General Information
Opening Ceremony

**Time:** Monday, 25 July 2016, 09.00–11.00  
**Location:** A: grey, Congress Center / CCH lecture hall 1  
Video transmission lecture hall 2  

Mistress of the ceremony: Christine Knipping

**Procedure**

- Opening of ICME-13 and welcome by the Convenor: Gabriele Kaiser  
- Greeting address by the Second Mayor of the Free and Hanseatic City of Hamburg: Katharina Fegebank  
- Greeting address by the Minister of the Federal Ministry of Education and Research: Johanna Wanka  
- Greeting address by the Vice-President of the University of Hamburg: Susanne Rupp  
- Welcome by the Chair of the LOC: Marianne Nolte

**Cultural programme**

- Greeting address by the President of IMU: Shigefumi Mori  
- Greeting address by the President of ICMI: Ferdinando Arzarello  
- Greeting address by the President of the Society of Didactics of Mathematics: Rudolf vom Hofe

**Awardee ceremony presided by Ferdinando Arzarello and Abraham Arcavi:**
- Felix-Klein Award: Michèle Artigue, Alan Bishop, chaired by Carolyn Kieran  
- Hans-Freudenthal Award: Frederick Leung, Jill Adler, chaired by Carolyn Kieran  
- Emma-Castelnuovo Award: Hugh Burkhardt and Malcolm Swan, chaired by Jeremy Kilpatrick

**Closing ceremony**

**Time:** Sunday, 31 July 2016, 11.00–12.30  
**Location:** A: grey, Congress Center / CCH, lecture hall 1

Master of the ceremony: Björn Schwarz  
Welcome by the Convenor of the ceremony: Björn Schwarz  
Report by the Secretary general of ICMI: Abraham Arcavi  
Closing remarks by the Convenor of ICME-13: Gabriele Kaiser  
Presentation of ICME-14: Jianpan Wang (Congress Chair Convenor), Binyan Xu (LOC Co-Chair), Yingkang Wu (LOC Secretary General) and their team

**Cultural programme**
Lectures of the ICMI awardees

All lectures will take place in parallel. Abstracts of all plenary activities can be found at the website or the web-based congress programme (Conftool).

**Time: Monday, 25 July 2016, 15.00–16.00**

**Felix-Klein-Award 2013**
Michèle Artigue (University Paris Diderot, France)
THE CHALLENGING RELATIONSHIP BETWEEN FUNDAMENTAL RESEARCH AND ACTION IN MATHEMATICS EDUCATION
Location: A: grey, Congress Center / CCH, lecture hall 2

**Hans-Freudenthal-Award 2013**
Frederick K. S. Leung (University of Hong Kong, Hong Kong – China)
MAKING SENSE OF MATHEMATICS ACHIEVEMENT IN EAST ASIA: DOES CULTURE REALLY MATTER?
Location: A: grey, Congress Center / CCH, lecture hall 1

**Felix-Klein-Award 2015**
Alan J. Bishop (Monash University, Australia)
ELEMENTARY MATHEMATICIANS FROM ADVANCED STANDPOINTS – A CULTURAL PERSPECTIVE ON MATHEMATICS EDUCATION
Location: J: red, Auditorium Maximum, lecture hall

**Hans-Freudenthal-Award 2015**
Jill Adler (University of the Witwatersrand, South Africa)
ONE FRAMEWORK, MULTIPLE PRACTICES: THE CASE FOR A COMMON DISCURSIVE RESOURCE
Location: C: turquoise, Main Building, lecture hall A; video transmission: lecture hall B

**Emma-Castelnuovo-Award 2015**
Hugh Burkhardt and Malcolm Swan (Shell Centre Nottingham, UK)
DESIGN, DEVELOPMENT AND THE SYSTEMIC IMPROVEMENT OF PRACTICE
Location: I: blue, Philosophical Tower, lecture hall A; video transmission: lecture hall B and C
Plenary Activities

Location of all plenary activities: A: grey, Congress Center / CCH, lecture hall 1 with video transmission from Monday to Wednesday to lecture hall 2

**Monday, 25 July 2016, 11.30 – 13.00**

Jinfa Cai (Chair) (University of Delaware, USA), Ida Mok (University of Hong Kong, China), Vijay Reddy (Human Sciences Research Council, South Africa), Kaye Stacey (University of Melbourne, Australia)

**Panel:**
INTERNATIONAL COMPARATIVE STUDIES IN MATHEMATICS: LESSONS FOR IMPROVING STUDENTS’ LEARNING

Comparing is one of the most basic intellectual activities. We consciously make comparisons to understand where we stand, both in relation to others as well as to our own past experiences. There has been a long history of international comparative studies in education. Comparative studies not only provide information on students’ achievement as examined in the context of the world’s varied educational institutions, but also help identify effective aspects of educational practice. The focus of this Plenary Panel is to discuss the ways to use international comparative studies to improve students’ learning. We take a strong position that the main purpose of educational research is to improve student learning. International comparative studies are not an exception.

In this panel, we use the phrase ‘international comparative studies’ to refer to those studies involving at least two countries, with an intention to compare at the country level. We include studies that are small and large, qualitative and quantitative, and initiatives of government and individual researchers. With this definition, we see international comparative studies in mathematics evolving from informal observations to the examination of performance differences, and from the examination of contributing factors to performance differences to the generation of theories, actions, and policies based on international comparative studies. In terms of scale, international comparative studies range from small-scale studies involving a few classes from two countries to the large-scale studies like TIMSS, PISA, and TEDS-M.

International comparative studies have completely transformed the way we see mathematics education. For example, because of the highest ranking of some Asian countries, the field of mathematics education over the years has been interested in mathematics education in Asian countries. We used to think that there was one basic way of teaching mathematics; international comparative studies, however, showed us many different ways of teaching mathematics in the classroom. We also learned that some student background variables (e.g., attitudes, gender) operate in different ways for students in different countries. With this panel, we have selected four lessons that we can learn from international comparative studies about improving students’ learning: (1) understanding students’ thinking, (2) examining the dispositions and experiences of mathematically literate students, (3) changing classroom instruction, and (4) making global research locally meaningful. We decided to focus on these four aspects because of their importance for the impact on students’ learning. The first two lessons focus on students’ mathematical thinking and literacy. The third lesson focuses on classroom instruction, and the fourth lesson focuses on policy in the local context. We have used both small- and large-scale international comparative studies to illustrate the lessons we can learn.
Plenary Activities

Tuesday, 26 July 2016, 08.30 – 09.30
Bill Barton (University of Auckland, New Zealand)
MATHEMATICS, EDUCATION AND CULTURE: A CONTEMPORARY MORAL IMPERATIVE

Ubiratan D’Ambrosio, in his plenary at ICME-5 in Adelaide in 1984, challenged us as mathematics educators to understand the relationship between mathematics, education and culture. He used the term ‘ethnomathematics’ to refer to the historical, political and cultural dimensions of mathematics and their relation to society. In subsequent writing he exposed humans’ responsibility to build a just and beautiful world on the “dorsal spine” of mathematics.

I will reflect on the reverberations of his work in the wider mathematics education community, and express some opinions about how this sub-field might contribute to resolving the cross-cultural crises that pervade contemporary society. Most of all, I offer some practical suggestions on how each of us, as individuals and communities, might nurture a gentle, beautiful, and productive peacock on the dorsal spine of mathematics, rather than an amoral monster that tramples much beneath it while leading the technological charge into the future.

Wednesday, 27 July 2016, 08.30 – 09.30
Günter M. Ziegler (Freie Universität Berlin, Germany)
“WHAT IS MATHEMATICS?” – AND WHY WE SHOULD ASK, WHERE ONE SHOULD EXPERIENCE OR LEARN THAT, AND WHO CAN TEACH IT

“What is Mathematics?” (with a question mark!) is the title of a famous book by Courant and Robbins, first published in 1941, which does not answer the question. The question is, however, essential: The public image of the subject (of the science, and of the profession) is not only relevant for the support and funding it can get, but it is also crucial for the talent it manages to attract – and thus ultimately determines what mathematics can achieve, as a science, as a part of human culture, but also as a substantial component of economy and technology.

“What does Doing Mathematics mean?” Is it realistic to say that anyone who teaches Mathematics should do that on the basis of a first-hand research experience in Mathematics? Weierstrass was a teacher for a number of years. Is he the teacher we want or need for the 21st Century high school education?

In this lecture we thus
• discuss the image of mathematics (where “image” might be taken literally!),
• sketch a multi-facettet answer to the question “What is Mathematics?”,
• try to give an equally multi-facettet answer to the question what “Doing Mathematics” might mean,
• stress the importance of learning “What is Mathematics” in view of Klein’s “double discontinuity” in mathematics teacher education, as observed by Felix Klein in 1908,
• present the “Panorama project’ as our response to this challenge,
• stress the importance of telling stories in addition to teaching mathematics, and finally
• suggest that the mathematics curricula at schools and at universities should correspondingly have space and time for at least three different subjects called Mathematics.
In some ways, the Third International Mathematics and Science Study (TIMSS) Video Studies of 1995 (Stigler et al., 1999) and 1999 (Hiebert et al., 2003) may be said to be the impetus for classroom studies in many countries. These studies created an awareness of how vast video data were and the possibilities of endless rich analysis. They also stimulated thought and academic discourse, about the conceptual framework and methodology of such studies, which led to subsequent video studies like the Learner’s Perspective Study (LPS) (Clarke, Keitel & Shimizu, 2006). This lecture will draw on mathematics classroom studies in Singapore, Hogan et al., (2013) and Kaur, (2009), and illustrate that using a particular frame (window) of analysis a “drill and practice” segment of a lesson was a “systematic consolidation of knowledge” segment when an alternative frame was used. It will also show that a “teacher-centred” lesson from one perspective was a “student-centred” lesson from another perspective and more. The lecture will end with some thoughts about what considerations are critical, for both the collection of video data and its analysis, when studying mathematics classrooms.

Helping young people develop mathematical skills, ways of thinking, and identities, and supporting classrooms as equitable communities of practice, entails for teachers a specialized set of instructional skills specific to the domain. What is involved, for example, in being able to see and hear the mathematics in students’ experiences, in speaking mathematics in ways that are attuned to one’s students, or in using representations and public records in ways that are comprehensible by students? We will examine instances of this sensitive work, analyze the special kinds of mathematical and other skills and orientations involved for teachers, and consider how fluency with such practices can be developed and supported.
TRANSITIONS IN MATHEMATICS EDUCATION

This panel addresses crucial issues concerning transitions in mathematics education (crucial for students, teachers, teacher educators, and researchers), and proposes a debate around sensitive questions related with these transitions.

Within an educational context any change can be viewed as a transition. In this panel we mainly consider two kinds of changes (separately or simultaneously):

- Conceptual change and learning as transition processes;
- Transitions between social groups or contexts with different mathematical practices.

We address mathematics teaching and learning at all ages: from preschool to university, and in the workplace (including the teachers’ passage from university to school).

Firstly, we synthesize research on these topics: what specific questions have been addressed; what findings were obtained. We show how different theoretical perspectives focus on different questions and obtain different results even concerning the same transitions, and we show how the articulation of different theoretical perspectives can enrich the analysis of transitions. Then we discuss sensitive issues, in particular:

- Are some transitions best viewed as continuous processes, or should they all be viewed as discontinuous?
- In the case of discontinuities, do they inevitably cause or constitute difficulties, or do they also offer productive opportunities, and how?
- In the case of continuities, how do we conceptualize both difficulties and opportunities?

Finally, drawing on the research synthesized and on the discussion about the above questions, we present different kinds of teaching interventions or teacher education programs (actual or potential) likely to support students and teachers in the transition process.
Invited Lectures (formerly Regular Lectures)

Slot 1: Tuesday, 26 July 2016, 10.30–11.30

Arthur Bakker (Utrecht University, Netherlands)
EMBODIED DESIGN OF PROPORTIONAL REASONING
Location: I: blue, Philosophical Tower, lecture hall A

Albrecht Beutelspacher (Mathematikum, Germany)
MATHEMATICAL EXPERIMENTS – AN IDEAL FIRST STEP INTO MATHEMATICS
Location: D: yellow, West Wing Building, room 221

Sigrid Blömeke (University of Oslo, Norway)
UNDERSTANDING MATHEMATICS TEACHERS’ COMPETENCIES AS PERSONALLY, SITUATIONALLY AND SOCIALY DETERMINED
Location: B: dark-brown, East Wing Building, room 221

Anthony A. Essien (University of the Witwatersrand, South Africa)
PREPARING PRE-SERVICE MATHEMATICS TEACHERS TO TEACH IN MULTILINGUAL CLASSROOMS: A COMMUNITY OF PRACTICE PERSPECTIVE
Location: I: blue, Philosophical Tower, lecture hall F

Rina Hershkowitz (Weizmann Institute for Science, Israel) & Stefan Ufer (LMU München, Germany)
WHAT DOES PME CONTRIBUTE TO MATHEMATICS EDUCATION?
Location: I: blue, Philosophical Tower, lecture hall C

Luckson Kaino (Tumaini University, Tanzania)
EXPLORING STUDENTS’ AND TEACHERS’ KNOWLEDGE OF MATHEMATICAL MODELING IN LINEAR EQUATIONS
Location: C: turquoise, Main Building, lecture hall C

Petar Kenderov (Institute of Mathematics and Informatics, Bulgaria)
THERE IS NO SUCH PROBLEM!
Location: C: turquoise, Main Building, lecture hall M

Masataka Koyama (Hiroshima University, Japan)
TWO-AXIS PROCESS MODEL FOR TEACHING AND LEARNING OF SCHOOL MATHEMATICS
Location: I: blue, Philosophical Tower, lecture hall G

Kyeong-Hwa Lee (Seoul National University, Republic of South Korea)
DOES THE ANSWER DEAL WITH THE COMPLEXITIES? STEERING REFLECTIVE MODIFICATION OF MATHEMATICAL TASKS
Location: C: turquoise, Main Building, lecture hall B

William McCallum (University of Arizona, United States of America)
LEARNING MODERN ALGEBRA FROM EARLY ATTEMPTS TO PROVE FERMAT’S LAST THEOREM: A COURSE FOR PROSPECTIVE TEACHERS
Location: C: turquoise, Main Building, lecture hall A

Cynthia Nicol (University of British Columbia, Canada)
CONNECTING MATHEMATICS, COMMUNITY, CULTURE AND PLACE: PROMISE, POSSIBILITIES AND PROBLEMS
Location: I: blue, Philosophical Tower, lecture hall D
Invited Lectures

Judith Njomgang Ngansop (University of Yaounde, Cameroon)
RELEVANCE OF LEARNING LOGICAL ANALYSIS OF MATHEMATICAL STATEMENTS
Location: I: blue, Philosophical Tower, lecture hall E

Janine Remillard (University of Pennsylvania, United States of America)
TEACHERS’ DESIGN DECISIONS AND THE ROLE OF INSTRUCTIONAL RESOURCES
Location: I: blue, Philosophical Tower, lecture hall B

Jianyue Zhang (People's Education Press, People's Republic of China)
THE REFORM AND DEVELOPMENT OF PLANE GEOMETRY MIDDLE SCHOOL COURSE IN CHINA
Location: C: turquoise, Main Building, lecture hall J

Meet the Plenary Speaker (Bill Barton)
Location: D: yellow, West Wing Building, Room 222

Slot 2: Wednesday, 27 July 2016, 10.30–11.30

Andrea diSessa (University of California, Berkeley, United States of America)
KNOWLEDGE IN PIECES: A FRAMEWORK FOR STUDYING LEARNING AT HIGH RESOLUTION
Location: C: turquoise, Main Building, lecture hall B

Nouzha El Yacoubi (University Mohammed V Rabat, Morocco)
TOWARDS COLLABORATIVE PROGRAMS IMPROVING THE MATHEMATICS TEACHER PROFESSIONAL DEVELOPMENT IN AFRICA!
Location: D: yellow, West Wing Building, room 221

Alena Hošpesová (University of South Bohemia, Czech Republic)
FORMATIVE ASSESSMENT IN INQUIRY BASED ELEMENTARY MATHEMATICS
Location: I: blue, Philosophical Tower, lecture hall C

Ronnie Karsenty (Weizmann Institute of Science, Israel)
PROFESSIONAL DEVELOPMENT OF MATHEMATICS TEACHERS: THROUGH THE LENS OF THE CAMERA
Location: C: turquoise, Main Building, lecture hall A

Jorge Soto-Andrade (University of Chile, Chile)
ENACTIVE METAPHORING IN THE LEARNING OF MATHEMATICS
Location: I: blue, Philosophical Tower, lecture hall G

Alina Spinillo (Federal University of Pernambuco, Brazil)
NUMBER SENSE IN ELEMENTARY SCHOOL CHILDREN: THE USES AND MEANINGS GIVEN TO NUMBERS IN DIFFERENT INVESTIGATIVE SITUATIONS
Location: C: turquoise, Main Building, lecture hall C

Denis Tanguay (Université du Québec à Montréal, Canada)
The Coordination between the Geometric Figure and the Associated Magnitude, Within the Conceptual Genesis of Angle
Location: I: blue, Philosophical Tower, lecture hall B

Mike Thomas (Auckland University, New Zealand)
BUILDING UP MATHEMATICS: THE LEGACY OF ZOLTÁN DIÉNÉS
Location: I: blue, Philosophical Tower, lecture hall D
Zulbiye Toluk Ucar (Abant Izzet baysal University, Turkey)
ISSUES IN TEACHING AND LEARNING FRACTIONS
Location: I: blue, Philosophical Tower, lecture hall E

Fabrice Vandebrouck (University Paris Diderot, France)
ACTIVITY THEORY IN FRENCH DIDACTIC
Location: I: blue, Philosophical Tower, lecture hall F

Ivan Vysotskiy (Moscow Center for Continuous Mathematical Education, Russian Federation)
POPULARIZATION OF THE PROBABILITIES THEORY AND STATISTICS IN SCHOOL THROUGH THE INTELLECTUAL COMPETITIONS
Location: C: turquoise, Main Building, lecture hall J

Helena Wessels (Stellenbosch University, South Africa)
NOTICING IN PRESERVICE TEACHER EDUCATION USING RESEARCH LESSONS AS CONTEXT FOR REFLECTION ON STUDENT THINKING LEARNING
Location: B: dark-brown, East Wing Building, room 221

Rina Zazkis (Simon Fraser University, Canada)
DIALOGUES ON NUMBER THEORY
Location: I: blue, Philosophical Tower, lecture hall A

Yan Zhu (East China Normal University, People’s Republic of China)
EQUITY IN MATHEMATICS EDUCATION: WHAT DID TIMSS AND PISA TELL US IN THE LAST TWO DECADES?
Location: C: turquoise, Main Building, lecture hall M

Meet the Plenary Speaker (Günter M. Ziegler)
Location: D: yellow, West Wing Building, Room 222

Slot 3: Friday, 29 July 2016, 10.30–11.30

Faïza Chellougui (University of Carthage, Tunisia)
STUDENTS’ USE OF CALCULUS FORMALISM AT THE FIRST YEAR UNIVERSITY
Location: I: blue, Philosophical Tower, lecture hall G

Nancy Chitera (University of Malawi, Malawi)
THERE IS MORE TO THE TEACHING AND LEARNING OF MATHEMATICS THAN THE USE OF LOCAL LANGUAGES: MATHEMATICS TEACHER PRACTICES
Location: C: turquoise, Main Building, lecture hall M

Michael N. Fried (Ben Gurion University of the Negev, Israel)
HISTORY OF MATHEMATICS, MATHEMATICS EDUCATION, AND THE LIBERAL ARTS
Location: C: turquoise, Main Building, lecture hall A

Inés Maria Gómez-Chacón (Universidad Complutense de Madrid, Spain)
HIDDEN CONNECTIONS, DOUBLE MEANINGS: A MATHEMATICAL EXPLORATION OF AFFECTIVE AND COGNITIVE INTERACTIONS IN LEARNING
Location: C: turquoise, Main Building, lecture hall B

Guenther Krauthausen (University of Hamburg, Germany)
NATURAL DIFFERENTIATION – AN APPROACH TO COPE WITH HETEROGENEITY
Location: D: yellow, West Wing Building, room 221
Yukihiko Namikawa (Sugiyama Jogakuen University, Japan)
MATHEMATICAL LITERACY AND CURRICULUM BASED ON IT – WITH SEVERAL REALIZATIONS IN JAPAN
Location: C: turquoise, Main Building, lecture hall J

Ricardo Nemirovski (San Diego State University, United States of America)
CRAFTING INFORMAL MATHEMATICS EDUCATION: LEARNING ABOUT CURVATURE AND BASKET WEAVING
Location: I: blue, Philosophical Tower, lecture hall D

Arthur Powell (Rutgers University, United States of America)
SOCIAL AND DISCURSIVE ACTIONS TO PROMOTE ONLINE COLLABORATIVE, MATHEMATICAL PRACTICES
Location: I: blue, Philosophical Tower, lecture hall A

Kurt Reusser (University of Zürich, Switzerland)
WHAT LARGE SCALE VIDEO STUDIES TELL US ABOUT THE IMPACT OF SURFACE AND DEEP LEVEL FEATURES OF INSTRUCTION ON STUDENTS
Location: B: dark-brown, East Wing Building, room 221

Jeremy Roschelle (SRI International, United States of America)
TECHNOLOGY FOR LEARNING MATHEMATICS: WHAT CAN WE LEARN FROM LARGE-SCALE STUDIES?
Location: I: blue, Philosophical Tower, lecture hall C

Carmen Sessa (Universidad Pedagógica de Buenos Aires, Argentine Republic)
EXPLORING WITH TEACHERS THE FUNCTIONAL WORLD IN AN ENRICHED ENVIRONMENT WITH COMPUTERS
Location: I: blue, Philosophical Tower, lecture hall E

Yahya Tabesh (Sharif University of Technology, Islamic Republic of Iran)
DIGITAL PEDAGOGY IN MATH LEARNING
Location: C: turquoise, Main Building, lecture hall C

Nadă Vondrová (Charles University in Prague, Czech Republic)
ABILITY TO NOTICE OR PROFESSIONAL VISION OF (FUTURE) MATHEMATICS TEACHERS
Location: I: blue, Philosophical Tower, lecture hall B

Meet the Plenary Speaker (Berinderjeet Kaur)
Location: D: yellow, West Wing Building, Room 222

Slot 4: Saturday, 30 July 2016, 10.30–11.30

Betina Duarte (Universidad Pedagógica, Argentine Republic)
VALIDATIONS AND REASONING IN MATHEMATICS: THE ROLE OF ANTICIPATION AS A FRAMEWORK FOR TEACHER INTERVENTIONS
Location: D: yellow, West Wing Building, room 221

Ann Gervasoni (Monash University, Australia)
THE IMPACT AND CHALLENGES OF EARLY MATHEMATICS INTERVENTION IN AUSTRALIAN CONTEXTS
Location: I: blue, Philosophical Tower, lecture hall D
Invited Lectures

Ansie Harding (University of Pretoria, South Africa)
THE ROLE OF STORYTELLING IN TEACHING MATHEMATICS
Location: I: blue, Philosophical Tower, lecture hall G

Roza Leikin (University of Haifa, Israel)
HOW CAN COGNITIVE NEURO-SCIENCE CONTRIBUTE TO MATHEMATICS EDUCATION?
FOCUSING ON PROBLEM SOLVING AND CREATIVITY IN MATH
Location: C: turquoise, Main Building, lecture hall A

Yeping Li (Texas A&M University, United States of America)
THE CHALLENGE OF DEVELOPING EXPERTISE IN MATHEMATICS TEACHING
Location: C: turquoise, Main Building, lecture hall B

Mdutshekelwa Ndlovu (Stellenbosch University, South Africa)
THEMES, PARADIGMS AND THEORIES IN RESEARCH ON THE PROFESSIONAL DEVELOPMENT OF MATHEMATICS TEACHERS IN SOUTH AFRICA
Location: B: dark-brown, East Wing Building, room 221

Asuman Oktac (Cinvestav-IPN, Mexico)
EXPLORATIONS WITH LINEAR ALGEBRA LEARNING
Location: C: turquoise, Main Building, lecture hall M

Ruth Rodriguez (Tecnologico de Monterrey, Mexico)
BUILDING COMMUNICATION BRIDGES BETWEEN MATH EDUCATION AND ENGINEERING EDUCATION COMMUNITIES: A DIALOGUE THROUGH MODELLING
Location: C: turquoise, Main Building, lecture hall J

Kenneth Ruthven (University of Cambridge, United Kingdom)
CONSTRUCTING DYNAMIC GEOMETRY: THE INTERPRETATIVE FLEXIBILITY OF MATHEMATICAL SOFTWARE IN TEACHING PRACTICE
Location: I: blue, Philosophical Tower, lecture hall A

Cristina Sabena (Università di Torino, Italy)
GESTURES AND MULTIMODALITY IN MATHEMATICS CLASSROOM ACTIVITIES:
A SEMIOTIC PERSPECTIVE
Location: I: blue, Philosophical Tower, lecture hall C

Xuhua Sun (University of Macau, Macau S.A.R. (China))
UNCOVERING CHINESE PEDAGOGY: SPIRAL VARIATION – THE UNSPOKEN PRINCIPLE FOR ALGEBRA THINKING TO DEVELOP CHINESE CURRICULUM
Location: I: blue, Philosophical Tower, lecture hall B

Meet the Plenary Speaker (Deborah Loewenbring Ball)
Location: D: yellow, West Wing Building, Room 222
Slot 5: Saturday, 30 July 2016, 15.00–16.00

Glenda Anthony (Massey University, New Zealand)
PRACTICE-BASED LEARNING IN INITIAL TEACHER EDUCATION: DEVELOPING INQUIRING PROFESSIONALS
Location: B: dark-brown, East Wing Building, room 221

Marta Civil (University of Arizona, United States of America)
INTERSECTIONS OF CULTURE, LANGUAGE, AND MATHEMATICS EDUCATION: LOOKING BACK AND LOOKING AHEAD
Location: C: turquoise, Main Building, lecture hall B

Linda Furuto (University of Hawaii at Manoa, United States of America)
PACIFIC ETHNOMATHEMATICS: NAVIGATING ANCIENT WISDOM AND MODERN CONNECTIONS
Location: D: yellow, West Wing Building, room 221

Liv Sissel Grønmo (University of Oslo, Norway)
THE ROLE OF ALGEBRA IN SCHOOL MATHEMATICS
Location: I: blue, Philosophical Tower, lecture hall G

Bernard R. Hodgson (Université Laval, Canada), Mogens Niss (Roskilde University, Denmark)
ICMI 1966-2016, A DOUBLE INSIDERS’ VIEW OF KEY ISSUES FROM THE LATEST HALF CENTURY OF THE INTERNATIONAL COMMISSION
Location: C: turquoise, Main Building, lecture hall A

Boris Koichu (Technion – Israel Institute of Technology, Israel)
MATHEMATICAL PROBLEM SOLVING IN CHOICE-AFFLUENT ENVIRONMENTS
Location: I: blue, Philosophical Tower, lecture hall A

Mehmet Fatih Özmantar (University of Gaziantep, Turkey)
MATHEMATICS TEACHER EDUCATORS’ KNOWLEDGE SOURCES IN COMING TO KNOW AN EFFECTIVE MATHEMATICS TEACHING
Location: C: turquoise, Main Building, lecture hall M

Wee Tiong Seah (University of Melbourne, Australia)
USING THE VALUES FRAMEWORK TO UNDERSTAND AND IMPROVE MATHEMATICS PEDAGOGY: EVIDENCE FROM FIVE CONTINENTS
Location: I: blue, Philosophical Tower, lecture hall B

Jeppe Skott (Linnaeus University, Sweden)
TEACHER IDENTITY REVISITED: RE-CENTRING THE INDIVIDUAL IN PARTICIPATORY ACCOUNTS OF PROFESSIONAL LEARNING
Location: I: blue, Philosophical Tower, lecture hall D
ICMI Studies and Survey Teams

**Time:** Monday, 25 July 2016, 16.30 – 18.00
All sessions take place in parallel.

**ICMI Studies**

**Location:** C: turquoise, Main Building, lecture hall A, Video Transmission: Main Building, lecture hall B, C

The following ICMI Studies will present their results:
- ICMI Study 21 on Mathematics Education and Language Diversity
  IPC members: Richard Barwell, Philip Clarkson, Anjum Halai, Mercy Kazima, Judit Moschkovich, Núria Planas, Mamokgethi Setati Phakeng, Paola Valero, Martha Villavicencio Ubilús
- ICMI Study 22 on Task Design
  Study Chairs: Anne Watson and Minoru Ohtani
- ICMI Study 23 on Primary Mathematics Study on Whole Numbers
  Study chairs: Mariolina Bartolini and Xuhua Sun

**Surveys Teams**


**Location:** J: red, Auditorium Maximum, lecture hall

Study Chair: Marcelo Borba (UNESP)

Study Team: Mario Sanchez Aguilar (CICATA Legaria), Petek Askar (Hacettepe University), Johann Engelbrecht (University of Pretoria), Salvador Linares (University of Alicante)

**DISTANCE LEARNING, BLENDED LEARNING, E-LEARNING IN MATHEMATICS (INCLUDING MOOC)**

**Abstract:** Digital technology has changed the possibilities of (mathematics) education. In particular the popularization of the Internet has created a new wave of distance mathematics education, such as online mathematics courses, in which there is only virtual contact between the teacher and their students. The Internet created many changes for the 21st century classrooms, with combinations of face-to-face and distance learning termed ‘blended learning’. This survey team will study research in this area, from both a theoretically and practical standpoint.

It will address questions such as:
- How is the Internet becoming “an actor” in the classroom?
- Is the Internet becoming pervasive in the classroom or is it creating a new meaning to what we think of as a classroom?
- Will the internet eventually mean the end of classrooms as we know them?
- Has the internet changed how we think of initial and continuing teacher education?
- What are the cultural, economic and political questions to be aware of as different countries experience different degrees of internet driven changes in mathematics education?
ICMI Studies & Survey Teams

Location: A: grey, Congress Center / CCH, lecture hall 1
Study Chair: Barbara Jaworski (Loughborough University)

Study Team: Olive Chapman (University of Calgary), Cristina Esteley (Universidad Nacional de Córdoba), Merrilyn Goos (University of Queensland), Masami Isoda (Tsukuba University), Marie Joubert (African Institute for Mathematical Sciences), Ornella Robutti (Università di Torino), Anne Bennison (University of Queensland), Alison Clark-Wilson (University College London), Annalisa Cusi (Università di Torino)

TEACHERS WORKING AND LEARNING THROUGH COLLABORATION

Abstract: Central to the learning of mathematics around the world is the work that teachers do in institutional settings and beyond, bringing mathematics to their students and supporting their students’ learning. It has long been recognized that teaching mathematics is a complex enterprise devolving from the nature of mathematics itself and drawing on a wide range of knowledge and skills. Teachers have not only to know mathematics but also to demonstrate didactical, pedagogical, technological, social and ethical knowledge in working with their students at any level. They have to work according to societal, political and institutional demands which shape and challenge their professional, personal, social and cultural identities. Teaching itself is a learning process in which reflections on teaching, in practice or in professional development activity, lead to new understandings of mathematics teaching and its development. Our knowledge of this complex scene has developed considerably in recent years, supported amongst others by a new journal Journal of Mathematics Teacher Education, an ICMI Study on The Professional Education and Development of Teachers of Mathematics in 2005 and an associated study volume (Even and Loewenberg Ball 2009), a Handbook of Mathematics Teacher Education (Wood, Jaworski, Krainer, Sullivan and Tirosh, 2008). Research in this survey shows a burgeoning of published papers and journal special issues illuminating this field.

Location: H: orange, Educational Building, lecture hall
Video Transmission: Educational Building, room 05
Study Chair: Mogens Niss (Roskilde University)

Study Team: Regina Bruder (TU Darmstadt), Kyungmee Park (Hongik University), Nuria Planas (University Autonomous of Barcelona), Ross Turner (Australian Council for Educational Research), Jhony Alexander Villa-Ochoa (University de Antioquia)

CONCEPTUALISATION OF THE ROLE OF COMPETENCIES, KNOWING AND KNOWLEDGE IN MATHEMATICS EDUCATION RESEARCH

Abstract: This talk presents the outcomes of the work of the ICME 13 Survey Team on ‘Conceptualisation of the role of competencies, knowing and knowledge in mathematics education research’.

Location: A: grey, Congress Center / CCH, lecture hall 2
Study Chair: Nathalie Sinclair (Simon Fraser University)

Study Team: Maria G. Bartolini Bussi (UNIMORE), Keith Jones (University of Southampton), Ulrich Kortenkamp (Universität Potsdam), Allen Leung (Hong Kong Baptist University), Kay Owens (Charles Sturt University), Alexey Zaslavsky (Central Institute of Economics and Mathematics)

GEOMETRY (INCLUDING TECHNOLOGY)

Abstract: This survey on the theme of Geometry Education (including new technologies) focuses chiefly on the time span since 2008. Based on our review of the literature published during this time span (in refereed journal articles, conference proceedings and edited books), we have jointly identified seven major threads of contributions as these relate to the early years of learning (pre-school and primary school) through to post-compulsory education and to the issue of mathematics teacher education for geometry.
Abstract: The planned survey will concentrate on the following aspects and questions:

1) Definitions of ›learning difficulties in mathematics‹ and ›mathematical learning difficulties‹ in different
countries: What are predictors for mathematical disabilities? What are specific mathematical topics the
students show poor competencies in?

2) Professional teacher knowledge for assistance of students with LD: The role of teachers’ beliefs
about and expectations of students who underperform in mathematics will be taken into account as well
as the role of teachers’ professional knowledge.

3) What do we know about effective teaching practices in (inclusive) mathematics classrooms? –
     Intervention studies. This aspect deals with the different research fields of mathematics education and
     special education and resulting requirements and problems for research that arise.

4) Concepts of assistance: This part will focus on concrete examples showing students’ practices and
     behaviour when interacting with mathematics and considering pupils’ behaviour in mathematics learning
     settings.

All four aspects will be discussed from an international as well as national perspective. The team
will review international research results as well as national features and developments. Concerning
the activities of ICMEs, the period from ICME-10 in 2004 will be included.
ICMI Affiliate Organisations

Time: Saturday, 30 July 2016, 16.30–18.00 (Parallel Presentations)

More details on the programme of each ICMI Affiliate organisation can be found in the electronic version of the programme of ICME-13.

Location: C: turquoise, Main Building, lecture hall B
Organisers: Angel Ruiz* (University of Costa Rica), Diane Briars, Matt Larson (National Council of Teachers of Mathematics), Patrick Rick Scott (U.S. Board on International Scientific Organizations)
CIAEM: INTER-AMERICAN COMMITTEE ON MATHEMATICS EDUCATION

Abstract: How can we effectively build the student learning presented in national curricular principles? What strategies and perspectives should guide teacher actions to ensure student learning? What sort of teacher professional development can support needed actions? These concerns which are so central to Mathematics Education are addressed by many theoretical results and experiences. The National Council of Teachers of Mathematics (NCTM, 2014) recently published “Principles to Actions: Ensuring Mathematical Success for All” which presents guidelines for guaranteeing mathematical success for all students. Similar strategies and perspectives support the implementation of curricular reform in Mathematics Education for elementary and secondary schools in Costa Rica.

Location: B: dark-brown, East Wing Building, room 221
Organisers: Peter Appelbaum* (Arcadia University), Charoula Stathopoulou (University of Thessaly), Gilles Aldon (ENS Lyon), Uwe Gellert (Freie Universität Berlin), Fernando Hitt (Université du Québec à Montréal), Christina Sabena (Università di Torino)
C.I.E.A.E.M. COMMISSION INTERNATIONALE POUR L’ÉTUDE ET L’AMÉLIORATION DE L’ENSEIGNEMENT DES MATHEMATIQUES

Abstract: The CIEAEM session aims at communicating current and future activities of CIEAEM to the mathematics education community. Just before ICME-13, CIEAEM will have held its 68th annual meeting. On that meeting, the contributions to research and educational practice of CIEAEM during the last 10 years or so will be synthesised and discussed under the headings of “Integration of theory and practice and/or/versus (evidence-based) research as a service to practice”, “Mathematisation and the role of mathematical modelling(s)”, “Towards a post-PISA curriculum?”, and “How can research / CIEAEM learn from the inside of the classroom?”. The presentation of CIEAEM at ICME-13 will offer insight into the unique style of communication during CIEAEM conferences, which are characterised by their ample space for collaborative discussion.
ICMI Affiliate Organisations

Location: K: purple, Law Building, lecture hall
Organisers: Viviane Durand-Guerrier (University of Montpellier), Cristina Sabena* (University of Torino), Stefan Zehetmeier (University of Klagenfurt), Despina Potari (National and Kapodistrian University of Athens), Miguel Ribeiro (University of Klagenfurt)
ERME: EUROPEAN SOCIETY FOR RESEARCH IN MATHEMATICS EDUCATION

Abstract: ERME has been established for promoting communication, cooperation and collaboration among European researchers (and increasingly with neighbor countries of Europe). The core of the ERME research activities is organized within the so-called Thematic Working Groups, which meet bi-annually at the Congress of ERME. To present current developments and issues of research within ERME, a collaboration of three Thematic Working Groups concerned with the development and research of mathematics teachers will give insights into their work. The study of mathematics teacher education and professional development has been a central focus of research during the last decades and has been focused also within ERME activities. Research programs focused on topics like reflection, collaboration, or teachers’ professional growth. In particular, models and programs of professional development, as well as their respective contents, methods, and impacts were described and analysed. Research increasingly focused not only on the participating teachers, but also on the role of teacher educators and academic researchers.

Location: I: blue, Philosophical Tower, lecture hall E
Organisers: Susanne Prediger (TU Dortmund), Susanne Schnell (University of Cologne), Jason Cooper (Weizmann Institute), Raja Herold* (University Duisburg-Essen), Angel Mizzi (University Duisburg-Essen)
YERME: YOUNG RESEARCHERS IN MATHEMATICS EDUCATION

Abstract: YERME is the young researcher association of ERME, which is specifically engaged in supporting early career researchers. Due to the interest in young researchers, the work and organization of YERME will be presented and complemented with exchanging experiences between the participants. This session is prepared by YERME with support from the German Young Researchers Group.

Location: E: mint, Economical Building, lecture hall B
Organisers: Luis Radford* (Laurentian University), Fulvia Furinghetti (Università di Genova), Kathleen Clark (Florida State University)
HPM: INTERNATIONAL STUDY GROUP ON THE RELATIONS BETWEEN HISTORY AND PEDAGOGY OF MATHEMATICS

Abstract: In the first part of this presentation, we offer an overview of HPM’s aims and current structure as well as some of the research lines that have been recently followed. In the second part, we present an outline of the historical roots of HPM. In the third part, we show a concrete example of HPM research inquiry.
ICMI Affiliate Organisations

Location: C: turquoise, Main Building, lecture hall C
Presenters: Gloria Ann Stillman*, Jill Brown (Australian Catholic University), Henry Pollak (Teachers College Columbia University), Helena Wessels (Stellenbosch University)
ICTMA: INTERNATIONAL STUDY GROUP FOR MATHEMATICAL MODELLING AND APPLICATIONS

Abstract: The International Community of Teachers of Mathematical Modelling and Applications has been in existence since 1983. It meets biennially, in odd numbered years. The mission of the ICTMA is to promote Applications and Modelling in all areas of mathematics education – primary and secondary schools, colleges and universities. The academic focus encompasses themes such as the design and delivery of programs, analysis of modelling competencies and student performance, and the development and improvement of effective methods of assessment. A developing focus on research has recognised the importance of establishing a robust knowledge base from which to address problems that continue to emerge. From the outset ICTMA adopted the position that it should maintain the integrity of its focus, which is about the teaching of mathematical modelling and applications, where teaching is interpreted broadly to incorporate related educational matters such as curriculum, assessment, and evaluation. The purpose of this session is to induct those who are interested into current activities of the organisation.

Location: C: turquoise, Main Building, lecture hall J
Organisers: Eva Norén*, Lisa Bjoklund Boistrup* (Stockholm University, Tamsin Meaney (Bergen University College), Yvette Solomon (Manchester Metropolitan University), Moneoang Leshota (National University of Lesotho)
IOWME: INTERNATIONAL ORGANIZATION OF WOMEN AND MATHEMATICS EDUCATION

Abstract: The International Organization of Women and Mathematics Education is an international network of individuals and groups who share a commitment to achieving equity in education and who are interested in the links between gender and the teaching and learning of mathematics. In our meeting at ICME 13 we will have three presentations with researchers from different parts of the world giving perspectives on women, girls and mathematics education.

Location: D: yellow, West Wing Building, room 221
Organisers: Roza Leikin* (University of Haifa), Linda Sheffield (Northern Kentucky University), Marianne Nolte (University of Hamburg)
MCG: INTERNATIONAL GROUP FOR MATHEMATICAL CREATIVITY AND GIFTEDNESS

Abstract: The purpose of MCG is to bring together mathematics educators, mathematicians, researchers, and others who are interested in nurturing and supporting the development of mathematical creativity and the realization of mathematical promise and mathematical giftedness, promoting the improvement of teaching and learning mathematics, and widening students’ abilities to apply mathematical knowledge in innovative and creative ways. The main goals of the group are to encourage research concerning the discovery, nurture and support of mathematical creativity, giftedness, talent and promise for all students, support investigation and dissemination of information on the role of teacher knowledge and education, educational systems, and cultural aspects related to the development of mathematical creativity and promise stimulate national and international activities to further the aims of the Group. At the MCG meeting the president’s report on the previous four years will be presented. The participants will be invited to discuss possible directions for the future development of the group. All the participants of the session will be encouraged to participate in a creative mathematical activity.
ICMI Affiliate Organisations

Location: E: mint, Economical Building, lecture hall A
Organisers: Tom Lowrie* (University of Canberra), Jennifer Way (University of Sydney)
MERGA: MATHEMATICS EDUCATION RESEARCH GROUP OF AUSTRALASIA

Abstract: This session showcases the journals and conferences of the Mathematics Education Research Group of Australasia (MERGA). A feature will be the book-launch of the ninth edition of the 4-yearly review of ‘Research in Mathematics Education in Australasia 2012–2015’ published by Springer. Delegates are invited to join us to celebrate the research achievements and dissemination activities of the Australasian mathematics education research community.

Location: C: turquoise, Main Building, lecture hall A
Presenters: Helen Forgasz (Monash University), Lulu Healy (Anhanguera University of São Paulo), Barbara Jaworski (Loughborough University), Peter Liljedahl (Simon Fraser University), Mamokgethi Setati Phakeng (University of Cape Town), Michal Tabach* (Tel-Aviv University), Wim Van Dooren (University of Leuven)
PME: INTERNATIONAL GROUP FOR THE PSYCHOLOGY OF MATHEMATICS EDUCATION

Abstract: The aim of the presentation is to allow researchers interested in mathematics education, who are not familiar with PME to learn about the aims, structure, and activities of the organisation. The session will also allow participants to gain a sense of the depth and breadth of research in mathematics education of interest to PME members. Each year during the PME conference, there is one plenary session consisting of a panel of researchers debating a ‘hot topic’ related to research in mathematics education. The panel topic is usually closely linked to the theme of the annual conference, and is led by an expert researcher in the field. In the ICME session, the focus will be on the mathematics education issues that were debated at the PME plenary panel sessions in the last four years. The speakers include the four panel leaders who will each present a short summary of the panel they convened. In addition, three PME officers – president, vice president and secretary – will communicate about PME activities more generally.

Location: C: turquoise, Main Building, lecture hall M
Organiser: Alexander Soifer* (University of Colorado at Colorado Springs)
WFNMC: WORLD FEDERATION OF NATIONAL MATHEMATICS COMPETITIONS

Abstract: The WFNMC Session will commence with the presentation of the four Paul Erdős Awards. Each new Laureate will be introduced by a citation of his or her achievements, followed by a presentation of the Paul Erdős Medal and the Certificate of Award. The new Paul Erdős Award Laureates expected to be present are: Petar Stoyanov Kenderov, Bulgaria; Luis Caceres, Puerto Rico; David C. Hunt, Australia; Kar-Ping Shum, Hong Kong
National Presentations

Time: Saturday, 30 July 2016, 16.30 – 18.00 (Parallel Presentations)

More details on the programme of each national presentation can be found in the electronic version of the programme of ICME-13.

Location: I: blue, Philosophical Tower, lecture hall B
Organisers: Esther Galina* (Universidad Nacional de Córdoba), Virginia Montoro (Universidad Nacional Del Comahue), Carmen Sessa (Universidad Pedagógica de Buenos Aires)

NATIONAL PRESENTATION OF ARGENTINA

The purpose of this presentation is to offer an overview of mathematics education in Argentina and the historic contributions that converge to its present. The presentation will include three principal topics: the characteristics of the actual education system and some special programme; the teacher education system and its particularities, and the development of the mathematics and the mathematics education in the country, their historical context, the actual associations and the current state of mathematics education as a research field.

Location: I: blue, Philosophical Tower, lecture hall D
Organiser: Victor Giraldo (Universidade Federal do Rio de Janeiro)

NATIONAL PRESENTATION OF BRAZIL: TEACHERS’ PROFESSIONAL DEVELOPMENT AND MATHEMATICS EDUCATION

Brazil’s National Presentation will focus on research in mathematics education in the country and its relationships with projects and initiatives for the improvement of teachers’ education (especially the ones involving different communities, as mathematicians, mathematics educators and mathematics teachers) – taking into account the challenges imposed by Brazilian education scenario. The 90 minutes presentation will be accompanied by printed and interactive multimedia material exhibitions.

This presentation is a joint initiative of the Brazilian Mathematical Society (SBM), the Brazilian Society of Mathematics Education (SBEM), the Brazilian Society of Applied and Computational Mathematics (SBMAC), and the Brazilian Statistics Association (ABE)

Location: I: blue, Philosophical Tower, lecture hall A
Organisers: Thérèse Dooley (Dublin City University), Elizabeth Oldham (Trinity College Dublin), Maurice O’Reilly* (St Patrick’s College Drumcondra), Gerry Shiel (Educational Research Centre)

NATIONAL PRESENTATION OF IRELAND

The past decade has seen reform in policy and practice in relation to mathematics education in Ireland, reform that has enjoyed robust public discussion and debate. Reviews of the school curricula for mathematics have been undertaken, and significant curricular reform at post-primary (secondary) level has been implemented (although not without controversy). For even longer, Ireland has participated in cycles of PISA and TIMSS. Whilst these activities have been informed by international research and practice, research in mathematics education in Ireland has been driven by several initiatives, both by Government agencies and by research centres and conference series in higher education institutions. There are researchers in mathematics education in all of the Universities and in some of the Institutes of Technology. Moreover, other state agencies conduct or commission large-scale research projects. More broadly, the Teaching Council was set up in 2006 to regulate the teaching profession and promote professional standards, and can be expected to impact on teachers’ professional development.
There are four big organizations concerning mathematics education in Japan. This national presentation is organized by the Japan Society of Mathematical Education (JSME) with the help of other organizations. First, we describe basic facts of Japanese Mathematics education. Since the 2008 revision of the Mathematics curriculum, mathematics activities, enjoying mathematics, data analysis etc. are emphasized more in the curriculum. Textbooks are approved by the Ministry of Education, Culture, Sports, Science and Technology. Second, Japanese mathematics problems will be displayed by active demonstration of a set of interesting and unique problems such as ‘Wasan: Japanese mathematics before introduction of Western Mathematics’ and ‘Origami: paper holding’. Furthermore, posters will be displayed. Third, National Test in Japan again started since 2007 by the effects of international mathematic studies such as IEA study TIMSS and OECD study PISA. Using the items of the National Test, the relations between knowledge and applications of Mathematics are described. Finally, the secrets of success, namely how to prepare excellent teachers of mathematics teaching as well as the method ‘Lesson study’ is well described.

Lower Mekong sub-region is a strategic area for new economic development of ASEAN community and mathematics is very important to support this development. Thus, the presentation aims to let the global mathematics education community recognizes the development of mathematics education in this region by providing the status quo of mathematics education during the last decade. It consists of three parts: 1) An overview of mathematics education of each country in the Lower Mekong Sub-region (Cambodia, Laos, Myanmar, Vietnam and Thailand), 2) Establishment of society of mathematics education and development in each country and 3) Emergent mathematics education community in the Lower Mekong Sub-Region.

This presentation discusses mathematics education in Turkey from the perspective of teaching and learning. Contemporary national high school mathematics curriculum, its varied applications and factors affecting its success are presented. While a modest selection of national and international attributes of educators and agencies is provided, the presentation mainly focuses on the achievements of Turkish Mathematical Society in enhancing mathematics education and promoting public interest in the subject. A showcase narration of an innovative school, Nesin Mathematical Village, which is designed to cultivate deep mathematics appreciation among its participants, is given.

The tables of the presenting nations are in the Auditorium Maximum (Building J: red) on the second floor.
European Didactic Traditions

Chair: Werner Blum (University of Kassel, Germany)
Team: Michèle Artigue (University Paris Diderot, France), Alessandra Mariotti (University of Siena, Italy), Rudolf Sträßer (JLU Giessen, Germany), Marja Van den Heuvel-Panhuizen (Utrecht University, Netherlands)

Panel Presentation

Time: Wednesday, 27 July 2016, 15.00 – 16.00
Location: C: turquoise, Main Building, lecture hall A

Programme:

Introduction and Overview: Werner Blum
• Description of the key features and the four parallel sub-strands:
• Role of Mathematics and Mathematicians: Alessandra Mariotti
• Role of Theory: Michèle Artigue
• Role of Design Activities: Marja Van den Heuvel-Panhuizen
• Role of Empirical Research: Rudolf Sträßer

Parallel Sessions

Time: Wednesday, 27 July 2016, 16.30–18.30

The case of France

Location: C: turquoise, Main Building, lecture hall A
Session Chair: Michèle Artigue

Programme:

• Luc Trouche (Ecole Normale Supérieure de Lyon) & Michèle Artigue (University Paris Diderot – Paris 7): The French didactic tradition – roots and development.
• Viviane Durand-Guerrier (University of Montpellier) & Aurélie Chesnais (University of Montpellier): Case study “Educational research on axial symmetry in the French tradition”.
• Marianna Bosch (University Ramon Llull – Spain): Case study “Research on school algebra in the French tradition”.
• Christine Knipping (Universität Bremen – Germany) as a critical friend: View of the French tradition, especially through the lens of validation and proof.
• Michela Maschietto (University of Modena e Reggio Emilia – Italy): Didactic interactions between France and Italy – a personal journey.
• Faïza Chellougui (University of Carthage – Tunisia): Didactic interactions between France and African countries – the case of Tunisia.
• Avenilde Romo Vazquez (Instituto Politécnico Nacional – Mexico): Didactic interactions between France and Latin-America – the case of Mexico.
The case of Germany

**Location:** C: turquoise, Main Building, lecture hall C

**Session Chair:** Rudolf Sträßer

**Programme:**

- Historical account of major developments in the roles of mathematics and mathematicians, of design of learning and teaching environments and of empirical research in Germany (interviews with Lisa Hefendehl-Hebeker, Hans-Georg Weigand and Erich C. Wittmann).
- Examples of recent German research: Stephan Hußmann on “Design of learning environments – expanding and enhancing subject matter didactics, Kerstin Tiedeman (University of Cologne) on “Helping primary students to learn maths – language and interaction”, Stefan Krauss on “COACTIV – the impact of professional knowledge on student achievement”.
- Barbro Grevholm (University of Agder – Norway), Edyta Nowinski (University of Osnabrück – Germany) and Nada Vondrová (Charles University – Czech Republic) as critical friends.

The case of Italy

**Location:** C: turquoise, Main Building, lecture hall J

**Session Chair:** Maria Alessandra Mariotti

**Programme:**

- Maria Alessandra Mariotti (University of Siena – Italy): Emergence and evolution of the Italian didactic tradition
- Paolo Boero (Università di Genova) & Mariolina Bartolini-Bussi (UNIMORE – Italy): Some features of the Italian situation, with a specific focus on the challenges of teacher education in a multicultural context.
- Nadia Dueck (Université de Nice – France) as critical friend: Report on experiences of collaborations and cooperation between France and Italy, in particular SFIDA.
- Xuhua Sun (University of Macau – Macau/China): View on the Italian tradition of mathematics education from a Chinese culture perspective.

The case of Netherlands

**Location:** C: turquoise, Main Building, lecture hall B

**Session Chair:** Marja Van den Heuvel-Panhuizen

**Programme:**

- Mathematics and mathematics education in the Netherlands (two videos).
- Paul Drijvers: “Driving to Hamburg” (activity for the audience and experiences from classroom).
- Marc van Zanten and Michiel Doorman: Video interviews with Adri Treffers and Jan de Lange.
- Marja van den Heuvel-Panhuizen: RME within the Dutch tradition.
- David Webb (USA), Harun Zulkardi and Ratu Ilma Indra Putri (Indonesia), and Sue Hough (England): Examples of interactions between the Dutch tradition and other countries.
- Cyril Julie (South Africa) and Dirk De Bock (Belgium) as critical friends: Comments on the Dutch tradition.
- Various interactions with the audience.
German-speaking Traditions in Mathematics Education Research

Chair: Hans Niels Jahnke

Team: Rolf Biehler (Universität Paderborn), Angelika Bikner-Ahsbahs (Universität Bremen), Uwe Gellert (Freie Universität Berlin), Gilbert Greefrath (University of Münster), Lisa Hefendehl-Hebeker (Universität Duisburg-Essen), Hans Niels Jahnke (Universität Duisburg-Essen), Götz Krummheuer (Goethe University Frankfurt), Timo Leuders (University of Education Freiburg), Marcus Nürenbörger (Technische Universität Dortmund), Andreas Obersteiner (University of Education Freiburg), Kristina Reiss (TUM School of Education), Bettina Rösken-Winter (Humboldt-Universität zu Berlin), Andreas Schulz (University of Education Freiburg), Andreas Vohns (Alpen-Adria-Universität Klagenfurt), Rudolf vom Hofe (Universität Bielefeld), Kathrin Vorhölter (University of Hamburg)

Panel Presentation

Time: Wednesday, 27 July 2016, 15.00 – 16.00
Location: J: red, Auditorium Maximum, lecture hall

Programme:

Introduction and Overview: Hans Niels Jahnke
Description of the eight sub-strands:
• Subject-matter didactics (German ‘Stoffdidaktik’): Lisa Hefendehl-Hebeker, Rudolf vom Hofe
• Design science: Marcus Nürenbörger, Bettina Rösken-Winter
• Modelling: Gilbert Greefrath, Kathrin Vorhölter
• Allgemeinbildung and Mathematical Literacy: Rolf Biehler, Hans Niels Jahnke
• Theory traditions in German speaking countries: Angelika Bikner-Ahsbahs, Andreas Vohns
• Classroom Studies: Uwe Gellert, Götz Krummheuer
• Educational Research on Learning and Teaching of Mathematics: Timo Leuders, Andreas Schulz
• Large-Scale Studies: Andreas Obersteiner, Kristina Reiss

Parallel Sessions

Time: Wednesday, 27 July 2016, 16.30 – 18.30

Allgemeinbildung and Mathematical Literacy

Location: I: blue, Philosophical Tower, lecture hall A
Session Chairs: Rolf Biehler & Hans Niels Jahnke

Programme:

• Hans Niels Jahnke: Mathematics and “Allgemeinbildung” at the Times of W. v. Humboldt
• Michael F. Fried (Ben Gurion University of the Negev, Israel): International Reaction
• Rolf Biehler: “Allgemeinbildung”, Mathematical Literacy, and Competence Orientation
• Mogens Niss (Roskilde University, Denmark): International Reaction
Classroom Studies

Location: I: blue, Philosophical Tower, lecture hall F
Session Chairs: Uwe Gellert & Götz Krummheuer

Programme:
- Götz Krummheuer: Interpretive Classroom Research – Origins, Insights, Developments
- Núria Planas (University Autonomous of Barcelona, Spain) & Michelle Stephan (UNC Charlotte, USA): Two International Commentaries
- Uwe Gellert: Classroom Research as Part of the Socio-Political Agenda
- Eva Jablonka (King’s College London, UK): International Commentary

Design science

Location: I: blue, Philosophical Tower, lecture hall D
Session Chairs: Marcus Nührenbörger & Bettina Roesken-Winter

Programme:
- Marcus Nührenbörger & Bettina Rösken-Winter: Mathematics education as a ‘design science’: Where did we start?
- Susanne Prediger (TU Dortmund, Germany) and Paul Cobb (Vanderbilt University, USA): Trends and developments
  - German Trends on Design Science
  - Design Research at the System Level
  - Discussion
- Michael Link (Ph St.Gallen, Switzerland), Ralph Schwarzkopf (Carl von Ossietzky Universität, Germany), Anna S. Steinweg (University of Bamberg, Germany) and Chun Ip Fung (Hong Kong Institute of Education, Hong Kong / China): Designing and researching substantial learning environments: Four examples of design experiments
- Erich Ch. Wittmann (Technical University of Dortmund, Germany): Design science revisited: Where are we now?

Educational Research on Learning and Teaching of Mathematics

Location: I: blue, Philosophical Tower, lecture hall G
Session Chairs: Timo Leuders & Andreas Schulz

Programme:
- Timo Leuders: Interdisciplinary research projects
  - Teaching self-regulation and problem solving (Regina Bruder – Video interview)
  - Teaching proof with heuristic worked examples (Alexander Renkl – Video interview)
- Andreas Schulz: Flexible mixed-methods approaches
  - Language and mathematics: From qualitative interviews to test development (Susanne Prediger – Video interview)
  - Mathematical cognition: Epistemology, Grounded theory and teaching experiment (Kathleen Philipp – Video interview)
- Kaye Stacey (University of Melbourne, Australia): International Commentary
Large-Scale Studies

Location: I: blue, Philosophical Tower, lecture hall B
Session Chairs: Andreas Obersteiner & Kristina Reiss

Programme:

- Kristina Reiss: Competency Modelling – Overview and Recent Developments
- Asko Heinze: Large Scale Assessment – Impact on Mathematics Education Research and Practice in Germany
- Ursula Itzlinger-Bruneforth (BIFIE, Austria): Competency Models and Large-Scale Assessments in Austria
- Fou-Lai Lin (National Taiwan Normal University, Taiwan): Discussion From an International Perspective

Modelling

Location: I: blue, Philosophical Tower, lecture hall C
Session Chairs: Gilbert Greefrath & Katrin Vorhölter

Programme:

- Gilbert Greefrath: Mathematical Modelling in German speaking countries: Introduction and Overview
- Rita Borromeo Ferri (University of Kassel, Germany), Dominik Leiß (Leuphana University of Lüneburg, Germany) & Stanislaw Schukajlow (University of Muenster, Germany): Cognitive and empirical approaches
  - Classification of Modelling Cycles – a view insight cognitive processes
  - Quantitative Research on Modelling – Examples from German Speaking Countries
- Katrin Vorhölter & Katja Maaß (University of Education Freiburg, Germany): Promoting modelling competencies
  - Implementing mathematical modelling in schools
  - Mathematical Modelling in professional development – traditions in Germany
- Gloria Stillman (Australian Catholic University, Australia) and Katrin Vorhölter: International Perspective on the German modelling debate, Discussion

Subject-matter didactics

Location: J: red, Auditorium Maximum, lecture hall
Session Chairs: Lisa Hefendehl-Hebeker & Rudolf vom Hofe

Programme:

- Lisa Hefendehl-Hebeker & Rudolf vom Hofe: Subject matter didactics: Overview of origin, main issues, theory, methods, and fields of application
- Sebastian Wartha (University of Education Karlsruhe, Germany) and Axel Schulz (Bielefeld University, Germany): Basic ideas (Grundvorstellungen) of natural numbers and fractions
- Hans Humenberger (Universität Wien, Austria) and Andreas Büchter (University of Duisburg-Essen, Germany): Clarity and strictness in calculus courses
Theory traditions in German speaking countries

Location: I: blue, Philosophical Tower, lecture hall E
Session Chairs: Angelika Bikner-Ahsbahs & Andreas Vohns

Programme:

- Angelika Bikner-Ahsbahs & Andreas Vohns: Hans-Georg Steiner – Theories in / of Mathematics Education (TME) as a scientific discipline
- Regina Bruder (TU Darmstadt, Germany): Joachim Lompscher – his activity theory approach and its influence on contemporary research in German-speaking countries
- Willi Dörfler (Universität Klagenfurt, Austria): Peirce and Wittgenstein – signs and their use
- Angelika Bikner-Ahsbahs: Networking of Theories in the tradition of TME?
- Andreas Vohns & Angelika Bikner-Ahsbahs: Looking ahead
Legacy of Felix Klein

Chair: Hans-Georg Weigand (University of Würzburg, Germany)

Team: William McCallum (University of Arizona, USA), Marta Menghini (Sapienza University of Rome, Italy), Michael Neubrand (University of Oldenburg, Germany), Gert Schubring (Universidade Federal do Rio de Janeiro, Brazil & Universität Bielefeld, Germany)

Panel Presentation

Time: Wednesday, 27 July 2016, 15.00 – 16.00
Location: H: orange, Educational Building, lecture hall
Video Transmission 1: Law Building, lecture hall,
Video Transmission 2: Social Science Building, lecture hall

Programme:

Hans-Georg Weigand: Introduction: What is and what could be the legacy of Felix Klein?
Renate Tobies (University of Jena): Biographical notes on Felix Klein
Introduction into the planned content of the different strands:
• William McCallum: Strand A – Functional thinking
• Michael Neubrand: Strand B – Intuitive thinking and visualization
• Marta Menghini & Gert Schubring: Strand C – Elementary mathematics from a higher standpoint

Parallel Sessions

Time: Wednesday, 27 July 2016, 16.30 – 18.30

Strand A: Functional Thinking

Location: H: orange, Educational Building, lecture hall
Session Chair: William McCallum

Programme:

• Katja Krüger (University of Paderborn, Germany): Functional Thinking – about the history of a didactical principle
• Hyman Bass (University of Michigan, USA): The K-12 Number Line: Is it built, or occupied?
• Pat Thompson (Arizona State University, USA): USA and South Korean teachers’ meanings for function and function notation as a potential source of differences in students’ learning
Strand B: Intuitive thinking and visualization

Location: K: purple, Law Building, lecture hall
Session Chair: Michael Neubrand

Programme:

Klein’s ideas on promoting visual thinking
- Martin Mattheis (Johannes Gutenberg Universität Mainz, Germany): Aspects of “Anschauung” in the work of Felix Klein
- Stefan Halverscheid (Georg-August-Universität, Germany) and Oliver Labs (Johannes Gutenberg Universität Mainz, Germany): Felix Klein’s mathematical heritage seen through 3D-models and other tools of visualization

The impact of Klein’s ideas on visualization and intuition into modern teaching mathematics
- Flavia Mammana (University of Catania, Italy): The modernity of the Meraner Lehrplan for teaching geometry
- Chris Rasmussen (San Diego State University, USA): Visualization and Intuition in Linear Algebra
- Ysette Weiss-Pidstrygach (Johannes Gutenberg – Universität Mainz, Germany): Grasping Mathematics: Using Treutlein’s Classroom Models in Teacher Education
- Sebastian Kitz (Bergische Universität Wuppertal, Germany): Animated mathematical films as teaching material

Strand C: Elementary Mathematics from a higher standpoint

Location: G: green, Social Science Building, lecture hall
Session Chair: Marta Menghini, Gert Schubring

Programme:

The content of the three volumes on “Elementary Mathematics from a higher Standpoint”
- Gert Schubring: Klein’s conception of ‘Elementary Mathematics from a higher Standpoint’
- Marta Menghini: Examples from Volume III of Klein’s conception
- Henrike Allmendinger (Fachhochschule Nordwestschweiz Basel, Switzerland): Examples of Klein’s practice
- Jeremy Kilpatrick (University of Georgia, USA): Comments on the previous part and introduction to the second part
- The impact on teacher education
  - Frédérick Gourdeau (Université Laval, Canada): Disciplinary mathematics and school mathematics for teacher education today
  - Masami Isoda (University of Tsukuba, Japan): Impact of Klein’s work for teacher education today – Asia
  - Katalin Gosztonyi (University of Szeged, Hungary and University Paris Diderot, France): Impact of Klein’s work for teacher education today – Eastern Europe

Thematic Afternoon
**TSG 1 – Early childhood mathematics education (up to age 7)**

Co-chairs: Elia Iliada (Cyprus), Joanne Mulligan (Australia)
Team members: Ann Anderson (Canada), Anna Baccaglini Frank (Italy), Christiane Benz (Germany)

**First Session: Tuesday, 26 July 2016, 12.00–13.30**
**Location:** E: mint, Economical Building, room 3034
Session Chairs: Joanne Mulligan, Iliada Elia

Presentations: Nathalie Sinclair*
(Simon Fraser University)
TIME, IMMERSION AND ARTICULATION: DIGITAL TECHNOLOGY FOR EARLY CHILDHOOD MATHEMATICS

Iliada Elia*, Kyriakoulla Evangelou, Athanasios Gagatsis
(University of Cyprus)
GESTURES AND THEIR INTERRELATIONS WITH OTHER SEMIOTIC RESOURCES IN THE LEARNING OF GEOMETRICAL CONCEPTS IN KINDERGARTEN

Jennifer S. Thom*
(Uvic)
CIRCLING THREE CHILDREN’S SPATIAL-GEOMETRIC REASONINGS

**Second Session: Wednesday, 27 July 2016, 12.00–13.30**
**Location:** E: mint, Economical Building, room 3034
Session Chairs: Anna Ethelwyn Baccaglini-Frank, Ann Anderson

Presentations: Gina Bojorque* (1, 2), Joke Torbeyns (1), Minna Hannula-Sormunen (3), Daniël Van Nijlen (1), Lieven Verschaffel (1)
(1: KU Leuven; 2: University of Cuenca; 3: University of Turku)
ECUADORIAN KINDERGARTNERS' SFON DEVELOPMENT

Sanne Rathé*, Joke Torbeyns, Bert De Smedt, Lieven Verschaffel
(KU Leuven)
KINDERGARTNERS’ SPONTANEOUS FOCUS ON NUMBER DURING PICTURE BOOK READING

Christiane Benz* (1), Jill Cheeseman (2), Yianna Pullen (3)
(1: University of Education Karlsruhe; 2: Monash University Melbourne; 3: Leibler Yavneh College)
MEASUREMENT MAKES NUMBERS SENSIBLE

**Third Session: Friday, 29 July 2016, 12.00–13.30**
**Location:** E: mint, Economical Building, room 3034
Session Chairs: Christiane Benz, Ann Anderson

Presentations: Joanne Mulligan* (Macquarie University Sydney)
PROMOTING EARLY MATHEMATICAL STRUCTURAL DEVELOPMENT THROUGH AN INTEGRATED ASSESSMENT AND PEDAGOGICAL PROGRAM
Miriam M. Lüken* (Universität Bielefeld)
REPEATING PATTERNING COMPETENCIES IN 3- AND 4-YEAR OLD KINDERGARTNERS

Ralf Kampmann*, Miriam M. Lüken (Universität Bielefeld Fak. Mathemaktik IDM)
THE INFLUENCE OF FOSTERING CHILDREN’S PATTERN AND STRUCTURE ABILITIES ON THEIR ARITHMETIC SKILLS IN GRADE 1

Pessia Tsamir, Dina Tirosh, Esther Levenson, Ruthi Barkai*, Michal Tabach
(Tel Aviv University)
PRESCHOOL TEACHERS’ RESPONSES TO REPEATING PATTERNS TASKS

Fourth Session: Saturday, 30 July 2016, 12.00–13.30
Location: E: mint, Economical Building, room 3034
Session Chairs: Joanne Mulligan, Iliada Elia

Presentations: Ann Anderson*, Jim Anderson
(University of British Columbia)
A STUDY OF TYPES OF MATH-IN-CONTEXT THAT PARENTS AND PRESCHOOLERS SHARE AT HOME

Herbert Ginsburg*
(Teachers College Columbia University)
INTERACTIVE MATHEMATICS BOOKS AND THEIR FRIENDS

Anna Ethelwyn Baccaglini-Frank*
(“Sapienza” University of Rome)
EDUCATIONAL MULTI-TOUCH APPLICATIONS, NUMBER SENSE, AND THE HOMOGENIZING ROLE OF THE EDUCATOR

TSG 2 – Mathematics education at tertiary level

Co-chairs: Victor Giraldo (Brazil), Chris Rasmussen (USA)
Team members: Irene Biza (UK), Reinhard Hochmuth (Germany), Azimeh Khakbaz (Iran)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: D: yellow, West Wing Building, room 221
Session Chair: Chris Rasmussen

Presentations: Megan Wawro* (1), Michelle Zandieh (2), Chris Rasmussen (3)
(1: Virginia Tech; 2: Arizona State University; 3: San Diego State University)
SYMBOLIZING AND BROKERING IN FOSTERING INQUIRY

Valeria Aguirre Holguín*
(University Autónoma de Ciudad Juárez)
UNIVERSITY STUDENTS’ BEHAVIOR WORKING WITH NEWLY INTRODUCED MATHEMATICAL DEFINITIONS

Dmitri Nedrenco*
(Julius-Maximilians-Universität Würzburg)
LEARNING HOW TO AXIOMATISE THROUGH PAPER FOLDING
**Second Session: Wednesday, 27 July 2016, 12.00 – 13.30**
**Location: D: yellow, West Wing Building, room 221**
Session Chair: Victor Giraldo

Presentations: Elena Nardi* (University of East Anglia)
**TEACHING MATHEMATICS TO NON-MATHEMATICIANS: WHAT CAN WE LEARN FROM RESEARCH ON TEACHING MATHEMATICIANS?**

Alon Pinto* (University of California)
**UNIVERSITY MATHEMATICS LECTURES: TEACHING THE SAME TOPICS BUT DIFFERENT MATHEMATICS**

Annie Selden*, John Selden (New Mexico State University)
**USING A THEORETICAL PERSPECTIVE TO TEACH A PROVING SUPPLEMENT FOR AN UNDERGRADUATE REAL ANALYSIS COURSE**

Jayaluxmi Naidoo* (University of KwaZulu-Natal)
**EXPLORING LECTURERS’ PERCEPTIONS OF USING TECHNOLOGY TO TEACH MATHEMATICS AT TERTIARY LEVEL**

**Third Session: Friday, 29 July 2016, 12.00 – 13.30**
**Location: D: yellow, West Wing Building, room 221**
Session Chair: Azimehsadat Khakbaz

Presentations: Greg Oates*, Tanya Evans (University of Auckland)
**MATHEMATICIANS AND MATHEMATICS EDUCATION: COLLABORATING FOR PROFESSIONAL DEVELOPMENT**

Pee Choon Toh*, Weng Kin Ho, Kok Ming Teo, Khiok Seng Quek, Tin Lam Toh, Eng Guan Tay, Romina Ann S. Yap (National Institute of Education)
**HOLISTIC APPROACH TO CURRICULUM REVIEW OF UNDERGRADUATE MATHEMATICS**

Ann O’Shea* (1), Sinead Breen (2), Conor Brennan (3), Frank Doheny (4), Fiona Lawless (5), Christine Kelly (1), Ciaran Mac an Bhaird (1), Seamus McLoone (1), Eabhnat Ni Fhloinn (3), Caítirion Ne She (1,3), Brien Nolan (3)
(1: Maynooth University; 2: St Patrick’s College; 3: Dublin City University; 4: Athlone Institute of Technology; 5: Dundalk Institute of Technology)
**USING TECHNOLOGY TO DEVELOP FORMATIVE ASSESSMENT RESOURCES FOR FIRST YEAR UNDERGRADUATE MODULES**

Christer Bergsten* (1), Eva Jablonka (2), Hoda Ashjari (1)
(1: Linköping University; 2: King’s College London)
**THE TRANSITION FROM SECONDARY TO TERTIARY MATHEMATICS EDUCATION – A SWEDISH STUDY**
Fourth Session: Saturday, 30 July 2016, 12.00–13.30
Location: D: yellow, West Wing Building, room 221
Session Chair: Irene Biza

Presentations: Melih Turgut* (1), Paul Drijvers (2)
(1: Faculty of Education; 2: Freudenthal Institute)
STUDENTS’ THINKING MODES AND THE EMERGENCE OF SIGNS IN LEARNING LINEAR ALGEBRA

Igor’ Kontorovich*
(The University of Auckland)
EXPLORING STUDENTS’ INTERACTIONS IN AN ONLINE FORUM THAT ACCOMPANIED A COURSE IN LINEAR ALGEBRA

Kathrin Nagel*, Kristina Reiss
(TUM School of Education)
MATHEMATICAL ARGUMENTATION OF FIRST-YEAR STUDENTS: THE INFLUENCE OF CONCEPTUAL KNOWLEDGE

TSG 3 – Mathematics education in and for work

Co-chairs: Geoff Wake (UK), Diana Coben (New Zealand)
Team members: Burkhard Alpers (Germany), Keith Weeks (UK), Peter Frejd (Sweden)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: E: mint, Economical Building, room 2175/2181
Session Chair: Burkhard Alpers

Presentations: Diana Coben* (1), Keith Weeks (2)
1: New Zealand; 2: University of South Wales
(1: University of Waikato; 2: University of South Wales)
AUTHENTICITY IN VOCATIONAL MATHEMATICS: SUPPORTING MEDICATION DOSAGE CALCULATION PROBLEM SOLVING IN NURSING

Vincent Jonker, Wijers Monica, Mooldijk Ad, Abels Mieke, Michiel Doorman*
(Utrecht University)
REDESIGN GUIDELINES TO ENRICH CLASSROOM TASKS FOR MATHS AND SCIENCE

Kees Hoogland* (1), Birgit Pepin (2)
(1: SLO – Netherlands Institute for Curriculum Development; 2: Eindhoven School of Education; 2: Eindhoven School of Education)
THE NUMERACY OF VOCATIONAL STUDENTS: EXPLORING THE NATURE OF THE MATHEMATICS USED IN DAILY LIFE AND WORK
Second Session: Wednesday, 27 July 2016, 12.00 – 13.30  
Location: E: mint, Economical Building, room 2175/2181  
Session Chair: Keith Weeks  

Presentations: John J. Keogh*, Theresa Maguire  
(Institute of Technology Tallaght Dublin)  
RE-CONTEXTUALISING MATHEMATICS FOR THE WORKPLACE  

Lisa Bjorklund Boistrup*  
(Stockholm University)  
MATHEMATICS IN THE WORKPLACE FROM DIFFERENT PERSPECTIVES:  
THE CASE OF ANITA, A NURSING AIDE  

David Pontin*  
(University of South Wales)  
VOCATIONAL MATHEMATICS & NURSING: SOCIAL MESSINESS & COMPLEXITY  

Third Session: Friday, 29 July 2016, 12.00 – 13.30  
Location: E: mint, Economical Building, room 2175/2181  
Session Chair: Peter Frejd  

Presentations: Phil Kane*  
(The University of Auckland)  
UNCOVERING ESTIMATION AND SPATIAL AWARENESS AS ELEMENTS  
OF WORKPLACE NUMERACY  

Karen Reitz-Koncebovski*, Katja Maaß  
(University of Education Freiburg)  
DIALOGUE BETWEEN SCHOOL AND THE WORLD OF WORK IN TEACHER  
PROFESSIONAL DEVELOPMENT (PD)  

Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30  
Location: E: mint, Economical Building, room 2175/2181  
Session Chairs: Geoff Wake, Diana Cicely Coben  

Presentations: Nathalie van der Wal*, Arthur Bakker, Paul Drijvers  
(Utrecht University)  
TECHNO-MATHEMATICAL LITERACIES IN THE WORKPLACES OF ENGINEERS  

Damon Rodger Whitten*  
(The University of Waikato)  
INSIDE A MATHEMATICS-FOR-WORK LESSON ON RATIO
**TSG 4 – Activities for, and research on, mathematically gifted students**

Co-chairs: Florence Mihaela Singer (Romania), Linda Sheffield (USA)
Team members: Matthias Brandl (Germany), Viktor Freiman (Canada), Kyoko Kakihana (Japan)

**First Session: Tuesday, 26 July 2016, 12.00–13.30**
**Location: E: mint, Economical Building, room 2067/71**
Session Chair: Matthias Brandl

Presentations: Florence Mihaela Singer* (1), Cristian Voica (2), Ildiko Peczzer (3)
(1: UPG University of Ploiesti; 2: University of Bucharest; 3: Concordia University)

**DISTINGUISHING BETWEEN GIFTED AND HIGH ACHIEVERS AT UNIVERSITY LEVEL**

Carmel Diezmann*
(Australian Catholic University)

**CHARACTERISTICS OF MATHEMATICAL GIFTEDNESS: LEARNING FROM EXTRAORDINARY MINDS**

Daniela Assmus*
(University of Halle-Wittenberg)

**CHARACTERISTICS OF MATHEMATICAL GIFTEDNESS IN EARLY PRIMARY SCHOOL AGE**

Elena Klimova*
(University of Education Schwaebisch Gmuend)

**BASIC PSYCHOLOGICAL NEEDS AND THE DEVELOPMENT OF INTEREST IN MATHEMATICS DURING A LEARNING ACTIVITY**

**Second Session: Wednesday, 27 July 2016, 12.00–13.30**
**Location: E: mint, Economical Building, room 2067/71**
Session Chair: Florence Mihaela Singer

Presentations: Michael Mhlolo*
(Central University of Technology)

**USING DISCOURSE THEORY TO ANALYZE MATHEMATICAL GIFTEDNESS WITHIN THE SOUTH AFRICAN EDUCATION SYSTEM**

Clara Benedicto*, Eva Arbona, Adela Jaime, Angel Gutierrez
(University of Valencia)

**ANALYSIS OF THE COGNITIVE DEMAND OF A GIFTED STUDENT’S STRATEGIES TO SOLVE GEOMETRIC PATTERNS PROBLEMS**

Andreas Poulos*
(Greek Ministry of Education)

**MATHEMATICAL PROBLEM SOLVING TECHNIQUES EMPLOYED BY GIFTED STUDENTS**

Ingrida Veilande*, Liga Ramana (2), Sandra Krauze (3)
(1: Latvian Maritime Academy; 2: Riga Technical University; 3: Valmiera State Gymnasium)

**PATHWAYS AND DEAD ENDS IN THE KINGDOM OF NUMBERS: PROBLEM SOLVING STRATEGIES USED BY STUDENTS IN MATHEMATICAL OLYMPIAD**
**Third Session: Friday, 29 July 2016, 12.00 – 13.30**  
**Location: E: mint, Economical Building, room 2067/71**  
**Session Chair:** Linda Sheffield

**Presentations:**  
Ban Har Yeap*  
(Marshall Cavendish Institute & Pathlight School)  
**INSTRUCTIONAL MODELS AND PEDAGOGICAL TOOLS TO ENCOURAGE AND PROMOTE MATHEMATICAL TALENTS**

Stephanie Schiemann*  
(Freie Universität Berlin)  
**FOSTERING TALENT IN MATHEMATICS – A GERMAN PERSPECTIVE**

Jeffrey J. Wanko*  
(Miami University)  
**DEVELOPING DEDUCTIVE AND SPATIAL REASONING WITH LANGUAGE-INDEPENDENT LOGIC PUZZLES**

Michael de Villiers*  
(University of KwaZulu-Natal)  
**ENRICHMENT FOR THE GIFTED: GENERALIZING SOME GEOMETRICAL THEOREMS & OBJECTS**

Ebrahim Talaee* (1), Zahra Rahimi (2)  
(1: Tarbiat Modarres University; 2: Tarbiat Modarres University)  
**LOOKING AT STUDENTS WHO DO GRADE SKIPPING FROM THE VIEWPOINT OF MATHEMATICAL REASONING**

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**Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30**  
**Location: E: mint, Economical Building, room 2067/71**  
**Session Chair:** Viktor Freiman

**Presentations:**  
Roza Leikin*  
(University of Haifa)  
**GIFTED STUDENT’S EXPECTATIONS AND TEACHERS’ CONCEPTIONS OF EFFECTIVE MATHEMATICS TEACHING**

Elisabet Mellroth* (1), Ralf Benölken (2)  
(1: Karlstad University; 2: University of Münster)  
**A CROSS COUNTRY COMPARISON OF PROFESSIONAL DEVELOPMENT PROGRAMS ON MATHEMATICAL PROMISE AND TALENT**

Aidan Fitzsimons*, Eabhnat Ni Fhloinn  
(Dublin City University)  
**EXAMINING IRELAND’S NEW SECOND-LEVEL MATHEMATICS SYLLABUS AND HOW IT CATERS FOR THE HIGH ACHIEVER**

Hiroko Kawaguchi Warshauer*, Max Leon Warshauer, Christina Starkey, Terence McCabe, Christina Zunker  
(Texas State University)  
**ADDRESSING THE NEEDS OF GIFTED STUDENTS: OPPORTUNITIES FOR STUDENTS, TEACHERS AND RESEARCHERS**
TSG 5 – Activities for, and research on, students with special needs

Co-chairs: Lourdes Figueiras (Spain), Rose Griffiths (UK)
Team members: Karen Karp (USA), Jens Holger Lorenz (Germany), Miriam Godoy Penteado (Brazil)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: I: blue, Philosophical Tower, lecture hall E
Session Chairs: Lourdes Figueiras, Miriam Godoy Penteado

Presentations: Laura Korten* (TU Dortmund)
MUTUAL LEARNING IN AN INCLUSIVE MATHEMATICS CLASSROOM

Solange Hassan Ali Ahmad Fernandes, Lulu Healy* (Universidade Anhanguera de São Paulo)
THE CHALLENGE OF CONSTRUCTING AN INCLUSIVE SCHOOL MATHEMATICS

Nancy C. Jordan* (1), Ilyse Resnick (1), Jessica Carrique (1), Nicole Hansen (2) (1: University of Delaware; 2: Fairleigh Dickinson University)
THE DELAWARE LONGITUDINAL STUDY OF FRACTION LEARNING: IMPLICATIONS FOR STUDENTS WITH MATHEMATICS LEARNING DIFFICULTIES

Barbara Anne Clarke* (1), Rhonda Faragher (2) (1: Monash University; 2: Australian Catholic University)
INCLUSIVE PRACTICES IN THE TEACHING OF MATHEMATICS: EARLY FINDINGS FROM RESEARCH INCLUDING CHILDREN WITH DOWN SYNDROM

Second Session: Wednesday, 27 July 2016, 12.00–13.30
Location: I: blue, Philosophical Tower, lecture hall E
Session Chairs: Lourdes Figueiras, Jens Holger Lorenz

Presentations: Rose Griffiths* (University of Leicester)
WORKING WITH CHILDREN IN PUBLIC CARE WHO HAVE DIFFICULTIES IN MATHEMATICS: THE EXAMPLE OF KYLE

Michael von Aster* (DRK Kliniken Berlin Westend)
THE CALCULARIS LEARNING SYSTEM: ENHANCING INDIVIDUAL ADAPTIVITY FOR AN INCLUSIVE TEACHING ENVIRONMENT

Russell Gersten* (Instructional Research Group)
RESPONSE TO INTERVENTION IN MATHEMATICS: RESEARCH ON EARLY PREVENTION OF MATHEMATICAL LEARNING DISABILITIES

Yan Ping Xin* (1), Xuan Yang (1), Ron Tzur (2), Xiaojun Ma (1), Joo Young Park (1) (1: Purdue University; 2: University of Colorado Denver)
PGBM-COMPS MATH PROBLEM-SOLVING PROGRAM: PROMOTE INDEPENDENT PROBLEM SOLVING OF STUDENTS WITH LD
Third Session: Friday, 29 July 2016, 12.00–13.30
Location: I: blue, Philosophical Tower, lecture hall E
Session Chairs: Karen Karp, Rose Griffiths

Presentations: Nicky Roberts* (University of Witwatersrand)
STORY-TELLING TASKS ON ADDITIVE RELATIONS WORD PROBLEMS: THE CASE OF MPHO

Mina Sedaghatjou* (1), Farzad Kooshyar (2), Stephen R. Campbell (3)
(1: Douglas College; 2: Simon Fraser University; 3: Simon Fraser University)
A NOVEL APPROACH ON ENABLING ADVANCED MATHEMATICAL COMMUNICATION IN ABSENCE OF SIGHT

Rossi DSouza*
(Homi Bhabha Centre for Science Education – TIFR)
CHALLENGING ABLEISM BY TEACHING PROCESSES RATHER THAN CONCEPTS

Fourth Session: Saturday, 30 July 2016, 12.00–13.30
Location: I: blue, Philosophical Tower, lecture hall E
Session Chairs: Lourdes Figueiras, Jens Holger Lorenz

Presentations: Lucie DeBlois* (Université Laval)
BEHAVIOURAL DIFFICULTIES COULD COME FROM LEARNING DIFFICULTIES: WHY AND HOW INTERVENE IN MATH CLASS

Vera Lúcia Capellini*
(Sao Paulo State University)
COLLABORATION BETWEEN SPECIAL AND COMMON EDUCATION FOR INCLUSIVE MATHEMATICAL EDUCATION IN BRAZIL

Susan Gerofsky*
(University of British Columbia)
EMBODIED MULTIMODAL MATHEMATICS & A RECONCEPTUALIZATION OF SENSORY IMPAIRMENTS

TSG 6 – Adult learning of mathematics – lifelong learning

Co-chairs: Jürgen Maaß (Austria), Pradeep Kumar Misra (India)
Team members: Terry Maguire (Ireland), Katherine Safford-Ramus (USA), Wolfgang Schloeglmann (Austria), Evelyn Süss-Stepancik (Austria)

First Session: Tuesday, 26 July 2016, 12.00 – 13.30
Location: E: mint, Economical Building, room 4045/46
Session Chairs: Katherine Safford-Ramus, Wolfgang Schloeglmann

Presentations: John O’Donoghue*
(University of Limerick)
MATHEMATICS EDUCATION AND ADULT LEARNERS IN IRELAND
Aoife Smith* (1), Niamh O’Meara (1), Terry Maguire (2)
(1: University of Limerick; 2: National Forum for Teaching and Learning)
AN INVESTIGATION INTO THE CONCEPT OF MATHS EYES WITH A PARTICULAR FOCUS ON THE MATHS EYES POSTER COMPETITION

Wolfram Meyerhöfer*
( Universität Paderborn)
ADULTS LEARN HOW TO CALCULATE. A CURRICULUM

Eun Young Cho*, Rae Young Kim
(Ewha Womans University)
LIFELONG LEARNING OF MATHEMATICS IN KOREA

Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: E: mint, Economical Building, room 4045/46
Session Chairs: Terry Maguire, Jürgen Maaß

Presentations: Katherine Safford-Ramus*
(Saint Peter’s University)
LEARNING FROM RESEARCH, ADVANCING THE FIELD

David Kaye*
(Adults Learning Mathematics)
DEFINING ADULT NUMERACY AND MATHEMATICS – AN ACADEMIC AND POLITICAL INVESTIGATION

Pradeep Kumar Misra*
(ICS University)
OPEN EDUCATIONAL RESOURCES: A POTENTIAL TOOL FOR ADULT LEARNERS, TO ACHIEVE LIFELONG LEARNING OF MATHEMATICS

Maria Elizabete Souza Couto*, Neomar Lacerda Silva Silva
(Universidade Estadual de Santa Cruz)
THE MATHEMATICS IN THE YOUNG PEOPLE AND ADULT EDUCATION: THE PRACTICE IN CONSTRUCTION

Alper Cihan Konyalio lu (1), Zekiye Morkoyunlu* (2), Solmaz Damla Gedik (3)
(1: Atatürk University; 2: Ahi Evran University; 3: Hacı Bekta Veli University)
PARENTS’ TRAINING IN MATHEMATICS: A SOCIATEL AWARENESS STUDY

Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: E: mint, Economical Building, room 4045/46
Session Chairs: Jürgen Maaß, Pradeep Kumar Misra

Presentations: Terry Maguire*, Aoife M. Smith
(The National Forum for the Enhancement of Teaching and Learning in Higher Education)
MATHS EYES-A CONCEPT WITH POTENTIAL

Sonja Beeli-Zimmermann*
(PH FHNW)
“I’VE NEVER COOKED WITH MY MATHS TEACHER” – THE DUALITY OF MATHEMATICS
Tetsu Yamaguchi, Shin Watanabe*  
(The Mathematics Certification Institute of Japan)  
SELF LEARNING MATHEMATICS ON LIFELONG LEARNING

Andrea Maffia* (1), Maria Alessandra Mariotti (2)  
(1: University of Modena and Reggio Emilia; 2: University of Siena)  
ADULTS’ CONCEPTION OF MULTIPLICATION: HOW DOES IT CHANGE ALONG STUDIES?

**Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30**  
**Location: E: mint, Economical Building, room 4045/46**  
Session Chair: Pradeep Kumar Misra, Evelyn Süss-Stepancik

Presentations: R. Ramanujam*  
(Institute of Mathematical Sciences)  
THEMES AND PROCESSES IN THE ADULT MATHEMATICS CLASSROOM

Barbara Miller-Reilly* (1), Charles O’Brien (2)  
(1: University of Auckland)  
A TALE OF TWO JOURNEYS

Jürgen Maaß*  
(University of Linz)  
THINKING ABOUT RELATIONS BETWEEN ADULTS LEARNING MATHEMATICS AND REALITY

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**TSG 7 – Popularization of mathematics**

Co-chairs: Christian Mercat (France), Patrick Vennebush (USA)  
Team members: Chris Budd (UK), Carlota Simões (Portugal), Jens Struckmeier (Germany)

**First Session: Tuesday, 26 July 2016, 12.00 – 13.30**  
**Location: E: mint, Economical Building, lecture hall A**  
Session Chair: Patrick Vennebush

Presentations: André Ross (4), Alexandra Haedrich (2), France Caron (3), Frédéric Gourdeau* (1), Bernard R. Hodgson (1)  
(1: Université Laval; 2: Institut des sciences mathématiques; 3: Université de Montréal; 4: Cégep de Lévis-Lauzon)  
ACCROMATH: TEN YEARS OF POPULARIZATION OF MATHEMATICS AIMED AT TEACHERS AND STUDENTS

Vasiliy Akimushkin (1), Athit Maitarattanakon (2), Sergei Pozdniakov* (2,1), Alexey Pukhov (3)  
(1: Saint-Petersburg State University; 2: Saint-Petersburg Electrotechnical University)  
POPULARIZATION THROUGH ACTIVITY

Andrea Oliveira Hall* (1), Sónia Pais (2)  
(1: University of Aveiro; 2: Polytechnic Institute of Leiria)  
THE MATHEMATICAL CIRCUS PROJECT

Vijayakumar Ambat*  
(COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY)  
MATHEMATICS TO THE MASSES− SOME SUCCESS STORIES FROM INDIA
Second Session: Wednesday, 27 July 2016, 12.00–13.30
Location: E: mint, Economical Building, lecture hall A
Group A – Session Chair: Carlota Isabel Leitão Pires Simoes

Presentations: Andreas Daniel Matt*, Bianca Violet
(Mathematisches Forschungsinstitut Oberwolfach)
COLLABORATIVE MATHEMATICS COMMUNICATION – EXPERIENCES AND EXAMPLES

Abdulkadir Erdogan*
(Anadolu University)
EXAMPLES OF POPULARIZATION ACTIVITIES IN TURKEY: EFFECTS, OPPORTUNITIES AND CHALLENGES

Nitsa Movshovitz-Hadar*
(Technion – Israel Institute of Technology)
MATHEMATICS OVER A CUP OF COFFEE OR: AN ATTEMPT TO CHANGE THE COMMON PUBLIC IMAGE OF THE QUEEN AND SERVANT OF SCIENCE

Location: E: mint, Economical Building, room 2079
Group B – Session Chair: Patrick Vennebush

Presentations: Anna Weltman* (1), Justin Lanier (2), Paul Salomon (3)
(1: University of California; 2: Georgia Institute of Technology; 3: John Burroughs School)
MATH MUNCH: WELCOMING KIDS TO THE MATHEMATICAL INTERNET

Michela Maschietto (1), Marco Turrini* (2)
(1: University of Modena e Reggio Emilia; 2: Liceo scientifico “A. Tassoni” MIUR; 2: Liceo scientifico “A. Tassoni” MIUR)
THE LABORATORY OF MATHEMATICAL MACHINES: EXHIBITIONS, EDUCATIONAL RESEARCH AND SESSIONS FOR STUDENTS

Violeta Vasilevska*
(Utah Valley University)
POPULARIZING MATH THROUGH OUTREACH PROGRAMS FOR YOUNG WOMEN

Third Session: Friday, 29 July 2016, 12.00–13.30
Location: E: mint, Economical Building, lecture hall A
Session Chair: Chris Budd

Presentations: Adi Nur Cahyono* (1,2), Matthias Ludwig (1)
(1: Goethe University Frankfurt; 2: Semarang State University)
MATHCITYMAP: EXPLORING MATHEMATICS AROUND THE CITY

Ana Cristina Oliveira*
(Atractor Association)
ATRACTOR – POPULARIZATING MATHEMATICS THROUGH VIRTUAL CONTENT

Donna Ann Dietz*
(American University)
THE USE OF MOBILE APPS TO ENHANCE STUDENT ENJOYMENT AND SKILLS IN RECREATIONAL MATHEMATICS
**Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30**

**Location:** E: mint, Economical Building, lecture hall A

Session Chair: Christian Mercat

Presentations: Rajaratnam Athmaraman Veeravalli*
(The Association of Mathematics Teachers of India)

**AN R & D AGENDA FOR POPULARISATION OF MATHEMATICS.**

Nicolas Pelay (2), Alix Boissiere* (1)
(1: Plaisir Maths; 2: LDAR)

**THE POPULARIZATION OF MATHEMATICS WITH THE DIDACTICAL AND PLAY-BASED CONTRACT**

Martin Andler* (1, 2)
(1: Université de Versailles St Quentin)

**LESSONS FROM A LARGE SCALE EXPERIMENT IN MATHEMATICS POPULARISATION IN FRANCE (CAP’MATHS, 2012 – 2016)**

Hong Zhang* (1), Likun Sun (2)
(1: Sichaun Nomal University; 2: Shanghai Pudong Institute of Education Development)

**THE IMPACT OF MATHEMATICS TRANSMISSION ON THE MATHEMATICS DEVELOPMENT IN THE PERIOD OF ANTI-JAPANESE WAR IN SICHUAN PROV**

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**TSG 8 – Teaching and learning of arithmetic and number systems (focus on primary education)**

Co-chairs: Pi-Jen Lin (Chinese Taipei), Terezinha Nunes (UK)
Team members: Shuhua An (USA), Beatriz Vargas Dorneles (Brazil), Elisabeth Rathgeb-Schnierer (Germany)

**First Session: Tuesday, 26 July 2016, 12.00 – 13.30**

**Location:** I: blue, Philosophical Tower, lecture hall A

Session Chair: Terezinha Nunes

Presentations: Lieven Verschaffel*, Joke Torbeyns, Greet Peters, Bert De Smedt, Pol Ghesquière
(KU Leuven)

**THE ASTONISHING EFFICACY OF THE ADDITION BY SUBTRACTION STRATEGY IN THE NUMBER DOMAIN UP TO 1000**

Terezinha Nunes*, Peter Bryant, Deborah Evans, Rossana Barros, Philea Chim, Susan Baker
(Department of Education)

**THE SIGNIFICANCE OF MATHEMATICAL REASONING AND ARITHMETIC FOR MATHEMATICAL ACHIEVEMENT IN PRIMARY SCHOOL**

Natalie Ming Yeng Kheu*
(University of Oxford)

**LEARNING NUMBERS IN DIFFERENT LANGUAGES**

Joke Torbeyns* (1), Marian Hickendorff (2), Lieven Verschaffel (1)
(1: KU Leuven; 2: Leiden University)

**DUTCH AND FLEMISH 9-12-YEAR-OLDS’ USE OF NUMBER-BASED AND DIGIT-BASED STRATEGIES ON MULTI-DIGIT SUBTRACTIONS**
Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: I: blue, Philosophical Tower, lecture hall A
Group A – Session Chair: Elisabeth Rathgeb-Schnierer

Presentations: Elisabeth Rathgeb-Schnierer* (1), Michael Green (2)
(1: University of Education; 2: University of North Carolina)
PROFILES OF COGNITIVE FLEXIBILITY IN ARITHMETIC REASONING:
A CROSS-COUNTRY COMPARISON OF ELEMENTARY STUDENTS (USA/GER)

Marian Hickendorff*
(Leiden University)
DUTCH 12-YEAR-OLDS’ USE OF SHORTCUT STRATEGIES IN SOLVING MULTIDIGIT
ARITHMETIC PROBLEMS

Andreas Schulz*
(University of Education Freiburg)
DEVELOPING CALCULATION STRATEGY USE IN DIVISION –
eFFECTS OF AN INTERVENTION STUDY

Jake McMullen*, Minna M. Hannula-Sormunen, Mikko Kainulainen, Erno Lehtinen
(University of Turku)
ENHANCING SPONTANEOUS FOCUSING ON QUANTITATIVE RELATIONS IN
PRIMARY SCHOOL

Location: I: blue, Philosophical Tower, room 1009
Group B – Session Chair: Beatriz Vargas Dorneles

Presentations: Beatriz Vargas Dorneles*
(Universidade Federal do Rio Grande do Sul)
COUNTING IN THE FIRST YEARS: THE CASE OF TWO DIFFERENT SYSTEMS

Yeong Ok Chong* (1), Yoo Kyung Jung (2)
(1: GYEONGIN NATIONAL UNIVERSITY OF EDUCATION; 2: DANGDONG ELEMENTARY SCHOOL)
5TH AND 6TH GRADE KOREAN STUDENTS’ PROPORTIONAL REASONING ABILITIES

Jeanne Koudogbo*
(UNIVERSITE DE SHERBROOKE)
DECIMAL NUMBER SYSTEM: KNOWLEDGE OF QUEBEC STUDENTS EDUCATED UNDER
THE 2001/1981 PROGRAMS AND TEACHING SITUATIONS

Ema Mamede*
(University of Minho)
YOUNG CHILDREN CAN LEARN TO REASON AND TO NAME FRACTIONS

Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: I: blue, Philosophical Tower, lecture hall A
Group A – Session Chair: An Shuhua

Presentations: Michael Gaidoschik* (1,2), Anne Fellmann (3), Silvia Guggenbichler (2)
(1: Alpen Adria Universität Klagenfurt; 2: PH Kärnten; 3: PH Salzburg)
MASTERY OF FACTS TO 20 IN FIRST GRADE: TWO TEACHERS,
TWO WAYS OF TEACHING, TWO KINDS OF SUCCESS
An Shuhua* (California State University)  
ASSESSING STUDENT LEARNING IN ARITHMETIC AND NUMBER SYSTEMS

Angel Mizzi* (1), Ban Heng Choy (2), Mi Yeon Lee (3)  
(1: University of Duisburg-Essen; 2: National Institute of Education; 3: Arizona State University)  
TEXTBOOK SIGNATURES: AN EXPLORATORY STUDY OF THE NOTION OF FRACTIONS IN GERMANY, SINGAPORE, AND SOUTH KOREA

Rubi Real*, Olimpia Figueras (Centro de Investigación y de Estudios Avanzados)  
A TEACHING MODEL OF FRACTIONS FOR EARLY GRADES OF MEXICAN PRIMARY SCHOOL

**Location:** I: blue, Philosophical Tower, room 1009  
**Group B – Session Chair:** Elisabeth Rathgeb-Schnierer

Presentations: Rossana Barros*, Lars-Erik Malmberg (University of Oxford)  
PRECURSORS FOR LEARNING FRACTIONS

Sutarto Hadi*, Kamaliyah Kamaliyah (Lambung Mangkurat University)  
THE FOURTH GRADERS’ SKILL IN COMPUTATIONAL ESTIMATION

Wei-Min Hsu*, Hsin-Sheng Huang (National Pingtung University)  
A COMPARISON OF FRACTION AND DECIMAL PROBLEMS IN THE ELEMENTARY MATHEMATICS TEXTBOOKS OF TAIWAN, FINLAND AND SINGAPORE

Sayonita Ghosh Hajra* (1), Victoria Kofman (2)  
(1: University of Utah; 2: Stella Academy)  
NEED OF THE HOUR: TEACHING MENTAL MATH STRATEGIES TO PRE-SERVICE TEACHERS

**Fourth Session:** Saturday, 30 July 2016, 12.00 – 13.30  
**Location:** I: blue, Philosophical Tower, lecture hall A  
**Session Chair:** Lin Pi-Jen

Presentations: Lin Pi-Jen* (National Hsinchu University of Education)  
FOSTERING NOVICE TEACHERS’ KNOWLEDGE OF STUDENTS’ ERRORS ON FRACTIONS DIVISION BY USING RESEARCHED-BASED CASES

Xenia Vamvakoussi* (1), Lina Vrakas (1), Aggeliki Lioliousi (2), Jake McMullen (3)  
(1: University of Ioannina; 2: University of Athens; 3: University of Turku)  
YOUNG CHILDREN’S SPONTANEOUS FOCUSING ON SIMPLE MULTIPLICATIVE RELATIONS

Charlotte Rechtsteiner-Merz*, Elisabeth Rathgeb-Schnierer (PH Weingarten)  
“ZAHLENBLICKSCHULUNG” AS APPROACH TO DEVELOP FLEXIBILITY IN MENTAL CALCULATION IN ALL STUDENTS
Bruce Brown*  
(Rhodes University)  
THINKING IN ACTION: EMBODIMENT AND STRUCTURE IN EARLY RATIONAL NUMBER LEARNING

**TSG 9 – Teaching and learning of measurement (focus on primary education)**

Co-chairs: Christine Chambris (France), Barbara Dougherty (USA)  
Team members: Insook Chung (USA), Silke Ruwisch (Germany), (Ravi) K. Subramaniam (India)

**First Session: Tuesday, 26 July 2016, 12.00 – 13.30**  
**Location:** E: mint, Economical Building, room 4020  
**Session Chair:** Christine Chambris

Presentations: Jeffrey Barrett* (1), Craig Cullen (1), Julie Sarama (2), Douglas Clements (2)  
(1: Illinois State University; 2: University of Denver)  
INVESTIGATING THE INTERSECTION OF SPATIAL MEASUREMENT AND SCHOOL MATHEMATICS

Arindam Bose (2), Kalyanasundaram Subramaniam* (1)  
(1: Homi Bhabha Centre for Science Education; 2: University of South Africa)  
IMPLICATIONS OF OUT-OF-SCHOOL KNOWLEDGE OF MEASUREMENT FOR SCHOOL LEARNING

**Second Session: Wednesday, 27 July 2016, 12.00 – 13.30**  
**Location:** E: mint, Economical Building, room 4020  
**Session Chairs:** Jeffrey Barrett, Subramaniam Kalyanasundaram

Presentations: Richard Lehrer*, Leona Schauble, Amy Holmes  
(Vanderbilt University/Peabody College)  
TRANSITIONS IN TEACHERS’ PEDAGOGICAL PRACTICES AND CONCEPTIONS OF MEASUREMENT SUPPORT CHILDREN’S CONCEPTUAL CHANGE

Linda Venenciano*  
(University of Hawaii at Manoa)  
USING MEASUREMENT AS A VEHICLE FOR DEVELOPING MATHEMATICS THINKING

Christine Chambris*  
(Universite de Cergy-Pontoise)  
A BRIEF HISTORY OF THE RELATIONS BETWEEN NUMBERS AND QUANTITIES IN THE PRIMARY CURRICULUM IN FRANCE

**Third Session: Friday, 29 July 2016, 12.00 – 13.30**  
**Location:** E: mint, Economical Building, room 4020  
**Session Chairs:** Linda Venenciano, Insook Chung

Presentations: Cheryl L. Eames* (1), Jeffrey E. Barrett (2), Craig J. Cullen (2), David Klanderman (3)  
(1: Southern Illinois University Edwardsville; 2: Illinois State University; 3: Trinity Christian College)  
EVALUATING A HYPOTHETICAL LEARNING TRAJECTORY FOR LENGTH MEASUREMENT USING A PARTIAL CREDIT RASCH MODEL
Julie Sarama* (1), Douglas Clements (1), Jeffrey Barrett (2)
(1: University of Denver; 2: Illinois State University)
DEVELOPMENT OF FOUNDATIONAL COGNITIONS AND CONCEPTS OF MEASUREMENT IN THE EARLY YEARS

Jeenath Rahaman*
(Tata Institute of Fundamental Research)
CONSTRUCTING THE CONCEPT OF AREA MEASUREMENT IN A CLASSROOM

Fourth Session: Saturday, 30 July 2016, 12.00–13.30
Location: E: mint, Economical Building, room 4020
Session Chair: Christine Chambris

Presentations: Valérie Munier*, Aurélie Chesnais
(LIRDEF)
MEASURE AND MEASUREMENT IN PHYSICS AND MATHEMATICS EDUCATION:
EPISTEMOLOGICAL ISSUES AND TREATMENT WITHIN TEXTBOOKS

TSG 10 – Teaching and learning of early algebra

Co-chairs: Carolyn Kieran (Canada), JeongSuk Pang (Korea)
Team members: Swee Fong Ng (Singapore), Deborah Schifter (USA),
Anna Susanne Steinweg (Germany)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: I: blue, Philosophical Tower, lecture hall F
Session Chairs: Carolyn Kieran, JeongSuk Pang

Presentations: Maria Blanton* (1), Barbara Brizuela (2), Ana Stephens (3)
(1: TERC; 2: Tufts University; 3: University of Wisconsin Madison)
ELEMENTARY CHILDREN’S ALGEBRAIC THINKING

John Mason*
(University of Oxford & Open University)
HOW EARLY IS TOO EARLY FOR THINKING ALGEBRAICALLY?

Nicolina Malara* (1), Giancarlo Navarra (2)
(1: University of Modena & Reggio Emilia (Italy); 2: University of Modena & Reggio Emilia (Italy))
EPISTEMOLOGICAL ISSUES IN EARLY ALGEBRA: OFFERING TEACHERS NEW WORDS AND PARADIGMS TO PROMOTE PUPILS’ ALGEBRAIC THINKING

David William Carraher* (1), Analucia Dias Schliemann (2)
(1: TERC; 2: Tufts University)
FUNCTIONAL RELATIONS IN EARLY ALGEBRAIC THINKING

Carolyn Kieran*
(Université du Québec à Montréal)
BEGINNINGS OF THE EARLY ALGEBRA MOVEMENT AND THE NATURE OF ITS EARLY RESEARCH
Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: I: blue, Philosophical Tower, lecture hall F
Session Chair: Swee Fong Ng

Presentations: JeongSuk Pang*
(Korea National University of Education)
A REVIEW OF RECENT RESEARCH THAT FOREGROUNDS THE EARLY ALGEBRA LEARNER

Kathrin Akinwunmi*
(TU Dortmund)
ON THE DEVELOPMENT OF VARIABLE CONCEPTS BY GENERALIZING MATHEMATICAL PATTERNS IN PRIMARY SCHOOL

Aisling Twohill*
(Dublin City University)
THE APPROACHES TO SOLUTION OF LINEAR FIGURAL PATTERNS ADOPTED BY CHILDREN ATTENDING IRISH PRIMARY SCHOOLS

Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: I: blue, Philosophical Tower, lecture hall F
Session Chair: Deborah Schifter

Presentations: Swee Fong Ng*
(Nanyang Technological University)
A NEUROSCIENCE PERSPECTIVE ON EARLY ALGEBRA: SYMBOLIC AND DIAGRAMMATIC APPROACHES TO ALGEBRA PROBLEM SOLVING

Yasufumi Kuroda* (1), Naoko Okamoto (2)
(1: Kyoto University of Education; 2: Ritsumeikan University)
CHANGES IN BRAIN ACTIVITY WHILE ENGAGING IN NUMBER SEQUENCE QUESTIONS OF VARYING DIFFICULTY

Max Stephens*, Cath Pearn
(The University of Melbourne)
FRACTION TASKS AND THEIR LINKS TO ALGEBRAIC THINKING

Anna Susanne Steinweg*
(University of Bamberg)
ALGEBRAIC THINKING – MATHEMATICAL KEY IDEAS

Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30
Location: I: blue, Philosophical Tower, lecture hall F
Session Chairs: Carolyn Kieran, JeongSuk Pang

Presentations: Deborah Schifter *
(Education Development Center)
BRINGING EARLY ALGEBRA INTO ELEMENTARY CLASSROOMS

Jodie Hunter*
(Massey University)
SCAFFOLDING TEACHER PRACTICE TO DEVELOP EARLY ALGEBRAIC REASONING
Susanne Marie Strachota* (1), Maria Blanton (2), Angela Murphy Gardiner (2), Bárbara Brizuela (3)
(1: University of Wisconsin – Madison; 2: TERC; 3: Tufts University)

CYCLES OF GENERALIZING ACTIVITIES IN THE CLASSROOM

TSG 11 – Teaching and learning of algebra

Co-chairs: Rakhi Banerjee (India), Amy Ellis (USA)
Team members: Helen Chick (Australia), Astrid Fischer (Germany), Heidi Strømskag Måsøval (Norway)

First Session: Tuesday, 26 July 2016, 12.00 – 13.30
Location: G: green, Social Science Building, room 27
Session Chair: Amy Ellis

Presentations: Kaye Stacey* (University of Melbourne)
ALGEBRA RESEARCH TO GUIDE TEACHING

Andrew Izsak*, Sybilla Beckmann, Eun Jung, Ibrahim Olmez (The University of Georgia)
CONNECTING MULTIPLICATION, UNIT FRACTIONS, AND EQUATIONS

Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: G: green, Social Science Building, room 27
Session Chair: Rakhi Banerjee

Presentations: Maria Blanton (1), Barbara Brizuela* (2), Anna Stephens (3)
(1: TERC; 2: Tufts University; 3: University of Wisconsin Madison)
CHILDREN’S UNDERSTANDING AND USE OF VARIABLE NOTATION

Jan Block* (Technische Universität Braunschweig)
FLEXIBLE ALGEBRAIC ACTION: SOLVING OF QUADRATIC EQUATIONS

Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: G: green, Social Science Building, room 27
Session Chair: Amy Ellis

Presentations: Jinfa Cai* (University of Delaware)
EARLY ALGEBRA LEARNING: ANSWERED AND UNANSWERED QUESTIONS

Thomas Janßen* (University of Bremen)
DEVELOPING ALGEBRAIC STRUCTURE SENSE OF LINEAR EQUATIONS AS TUNING INTO A NEW ACTIVITY
Fourth Session: Saturday, 30 July 2016, 12.00–13.30
Location: G: green, Social Science Building, room 27
Session Chair: Rakhi Banerjee

Presentations: Heidi Strømskag*
(Norwegian University of Science and Technology)
EVOLUTION OF THE MILIEU FOR A PARTICULAR PIECE OF MATHEMATICAL KNOWLEDGE

Erik Tillema*, Andrew Gatza
(Indiana University Purdue University Indianapolis)
A QUANTITATIVE APPORACH TO ESTABLISHING CUBIC IDENTITIES

TSG 12 – Teaching and learning of geometry (primary level)

Co-chairs: Sinan Olkun (Turkey), Ewa Swoboda (Poland)
Team members: Paola Vighi (Italy), Yuan Yuan (Chinese Taipei), Bernd Wollring (Germany)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: H: orange, Educational Building, room 206
Session Chair: Ewa Swoboda

Presentations: Sinan Olkun* (1), Mehmet Hayri Sari (2)
(1: TED University; 2: Nevsehir Haci Bektas University)
GEOMETRIC ASPECT OF NUMBER LINE ESTIMATIONS

Douglas Clements*, Julie Sarama
(University of Denver)
YOUNG CHILDREN’S CONCEPTUALIZATION AND LEARNING OF GEOMETRIC FIGURES

Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: H: orange, Educational Building, room 206
Session Chairs: Paola Vighi, Sinan Olkun

Presentations: Yuan Yuan*
(Chung Yuan Christian University)
EFFECT OF DIFFERENT MANIPULATIVES ON FIRST GRADERS’ LEARNING OF THE ABILITY TO COUNT CUBIC BLOCKS IN A 3-D FIGURE

Raquel Isabel Carrera-Curin* (1), Caroline Buff (2), Fabienne Venant (3)
(1: Université du Québec à Montréal; 2: Université de Bordeaux; 3: Université du Québec à Montréal)
FRANCE-QUÉBEC COMPARISON ON LANGUAGE PRACTICES IN GEOMETRY CLASS IN PRIMARY SCHOOL

Tsu-Nan Lee*
(The University of Melbourne)
USING QUESTIONING AND ARGUMENTATIVE ACTIVITIES TO HELP GRADE 5 STUDENTS GENERALIZE TRIANGLE PROPERTIES
Third Session: Friday, 29 July 2016, 12.00 – 13.30  
Location: H: orange, Educational Building, room 206  
Session Chair: Sinan Olkun  

Presentations: Paola Vighi*  
(University of Parma)  
FROM ABSTRACT ART TO GEOMETRICAL UNDERSTANDING  

Masakazu Okazaki*  
(Okayama University)  
HYPOTHESIZING HOW FIFTH GRADERS CONSTRUCT GEOMETRIC DEFINITIONS BASED ON INCLUSION RELATIONS AMONG GEOMETRIC FIGURES

Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30  
Location: H: orange, Educational Building, room 206  
Session Chair: Yuan Yuan  

Presentations: Darina Jirotkova*  
(Faculty of Education)  
SCHEME OF GEOMETRICAL CONCEPTS  

Ewa Swoboda*  
(University of Rzeszów)  
THE RHYTHMICAL ORGANIZATION OF SPACE AND THE CHILD’S INTELECTUAL DEVELOPMENT

TSG 13 – Teaching and learning of geometry – secondary level  
Co-chairs: Ui Hock Cheah (Malaysia), Patricio Herbst (USA)  
Team members: Matthias Ludwig (Germany), Philippe Richard (Canada), Sara Scaglia (Argentina)

First Session: Tuesday, 26 July 2016, 12.00 – 13.30  
Location: E: mint, Economical Building, room 2101/2105  
Session Chair: Ui-Hock Cheah  

Presentations: Alain Kuzniak*  
(Université Paris Diderot)  
RESEARCH ON GEOMETRY EDUCATION: THE NEED OF THEORETICAL BENCHMARKS  

Philippe R. Richard* (1), Gagnon Michel (2), Fortuny Josep Maria (3)  
(1: Université de Montréal; 2: École Polytechnique de Montréal; 3: Universitat Autònoma de Barcelona)  
THE ARTICULATION OF GEOMETRY PROBLEMS: A MAJOR EDUCATIONAL CHALLENGE

Second Session: Wednesday, 27 July 2016, 12.00 – 13.30  
Location: E: mint, Economical Building, room 2101/2105  
Group A – Session Chair: Philippe R. Richard  

Presentations: Günter Maresch*  
(University of Salzburg)  
HOW TO DEVELOP SPATIAL ABILITY? RESULTS FROM THE RESEARCH PROJECT GEODIKON
Leah Michelle Frazee*, Michael T. Battista, Candace Joswick, Emanuel Clayton
(The Ohio State University)
STUDENTS’ USE OF PROPERTY KNOWLEDGE AND SPATIAL VISUALIZATION
IN REASONING ABOUT 2D ROTATIONS

Stephan Berendonk, Marc Sauerwein*
(University of Bonn)
EPISTEMOLOGICAL FEATURES OF A CONSTRUCTIONAL APPROACH TO
REGULAR 4-POLYTOPES

Location: E: mint, Economical Building, room 2163/2168
Group B – Session Chair: Matthias Ludwig

Presentations: Mohan Chinnappan* (1), Bruce White (2), Sven Trenholm (3)
(1: University of South Australia; 2: University of South Australia; 3: University of South Australia)
SYMBIOSIS BETWEEN SPECIALISED AND PEDAGOGICAL KNOWLEDGE IN GEOMETRY

Agida Manizade* (1, 3), Dragana Martinovic (2)
(1: Radford University; 2: University of Windsor;
3: Secondary Mathemtics Professional Development Center)
GEOMETRY TEACHERS’ KNOWLEDGE: INSIGHTS FROM THE TRAPEZOID STUDY

Carlotta Soldano* (1), Yael Luz (2)
(1: University of Torino; 2: University of Haifa)
PLAYING WITH GEOMETRY: A GAME, AN EDUCATIONAL INQUIRY ACTIVITY
OR AN ASSESSMENT TASK?

Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: E: mint, Economical Building, room 2101/2105
Group A – Session Chair: Sara Scaglia

Presentations: Sharon Louise Senk* (1), Denisse Rubilee Thompson (2)
(1: Michigan State University; 2: University of South Florida)
EXPLORING MODELS OF SECONDARY GEOMETRY ACHIEVEMENT

Carine Steyn*, Tulsi Morar
(Nelson Mandela Metropolitan University)
TYPICAL ERRORS IN GEOMETRY OF GRADE 9 LEARNERS IN SOUTH AFRICA

Hilal Gulkilik* (1), Hasan Hüseyin Ugurlu (2), Nejla Yürük (3), Patricia Moyer-Packenham (4)
(1: Gazi University; 2: Gazi University; 3: Gazi University; 4: Utah State University)
THE GROWTH OF MATHEMATICAL UNDERSTANDING:
ELIF’S ENGAGEMENT WITH REPRESENTATIONS IN PIRIE-KIEREN LEVELS

Location: E: mint, Economical Building, room 2163/2168
Group B – Session Chair: Ui-Hock Cheah

Presentations: Scott Steketee* (1), Daniel Scher (2)
ENACTING FUNCTIONS FROM GEOMETRY TO ALGEBRA
Brittany April Webre*, Shawnda Smith, Gilbert Cuevas
(Texas State University)
DIFFERENCES IN SELF-REPORTING IMPLEMENTATION OF INSTRUCTIONAL
STRATEGIES USING A DYNAMIC GEOMETRY APPROACH

Alexander Kevin White*, Zhonghong Jiang, M. Alejandra Sorto
(Texas State University)
THE EFFECT OF DYNAMIC GEOMETRY APPROACH ON GEOMETRY ACHIEVEMENT
AND CONJECTURE ABILITY

Fourth Session: Saturday, 30 July 2016, 12.00–13.30
Location: E: mint, Economical Building, room 2101/2105
Session Chair: Matthias Ludwig

Presentations: Ui-Hock Cheah*
(Methodist Council of Education)
DESIGNING INSTRUCTION TOWARDS MATHEMATICAL LITERACY IN GEOMETRY:
A CASE STUDY

Michelle Cirillo*
(University of Delaware)
ENGAGING STUDENTS WITH NON-ROUTINE GEOMETRY PROOF TASKS

Patricio G. Herbst*
(University of Michigan)
IS THE WORK OF TEACHING GEOMETRY SUBJECT SPECIFIC?

TSG 14 – Teaching and learning of probability

Co-chairs: Carmen Batanero (Spain), Egan Chernoff (Canada)
Team members: Joachim Engel (Germany), Ernesto Sánchez (Mexico), Hollylynne Lee (USA)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: K: purple, Law Building, room 18/19
Session Chair: Carmen Batanero

Presentations: Manfred Borovcnik* (1), Ramesh Kapadia (2)
(1: University of Klagenfurt; 2: University of Klagenfurt)
REASONING WITH RISK: A SURVIVAL GUIDE

Cynthia Langrall*
(Illinois State University)
THE RISE AND FALL OF PROBABILITY IN THE K–8 MATHEMATICS CURRICULUM
IN THE UNITED STATES

Hollylynne Lee* (1), Helen Doerr (2)
(1: North Carolina State University; 2: Syracuse University)
A FRAMEWORK OF PROBABILITY CONCEPTS NEEDED FOR TEACHING REPEATED
SAMPLING APPROACHES TO INFERENCE
Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: K: purple, Law Building, room 18/19
Session Chair: Hollylynne Lee

Presentations: Joachim Engel*
(Ludwigsburg University of Education)
BETWEEN FEAR AND GREED: THE SIX LOOSES

Ernesto Sánchez*, Miguel Mercado, Jaime García
(Centro de Investigación y de Estudios Avanzados del IPN)
THEORETICAL DOGMATISM AND EMPIRICAL COMMITMENT IN THE INFORMAL PROBABLISTIC REASONING OF HIGH SCHOOL STUDENTS

Egan Chernoff*, Ilona Vashchyshyn, Heidi Neufeld
(University of Saskatchewan)
COMPARING THE RELATIVE PROBABILITIES OF EVENTS

Peter Bryant* (1), Terezinha Nunes (1), Deborah Evans (1), Laura Gottardis (1), Maria-Emmanouela Terlekti (2)
(1: University of Oxford; 2: Oxford Brookes University)
TEACHING 9 AND 10 YEAR OLD CHILDREN ABOUT RANDOMNESS

Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: K: purple, Law Building, room 18/19
Group A – Session Chair: Joachim Engel

Presentations: Caterina Primi*, Francesca Chiesi
(University of Florence)
STATISTICS ANXIETY: A MEDIATOR IN LEARNING PROBABILITY

Assumpta Estrada* (1), Carmen Batanero (2), Carles Comas (1), Carmen Diaz (3)
(1: University of Lleida; 2: University of Granada; 3: University of Huelva)
EXPLORING TEACHERS’ ATTITUDES TOWARDS PROBABILITY AND ITS TEACHING

Emilse Gómez-Torres* (1), Carmen Diaz (2), Jose Miguel Contreras (3)
(1: Universidad Nacional de Colombia; 2: Universidad de Huelva; 3: Universidad de Granada)
PROSPECTIVE TEACHERS SOLUTIONS TO A PROBABILITY PROBLEM IN A SAMPLING CONTEXT

Robert Adam Molnar*
(Oklahoma State University)
HIGH SCHOOL MATHEMATICS TEACHERS’ UNDERSTANDING OF INDEPENDENT EVENTS

Susanne Podworny*
(University of Paderborn)
DESIGN OF A COURSE FOR LEARNING PROBABILITY VIA SIMULATIONS WITH TINKERPLOTS
Location: K: purple, Law Building, room 15+16
Group B – Session Chair: Ernesto Sánchez

Presentations: Pedro Rubén Landín*, Jesús Salinas (CCH-UNAM)
PROBABILISTIC REASONING IN HIGH SCHOOL STUDENTS ON SAMPLE SPACE AND PROBABILITY OF COMPOUND EVENTS

Lydia Mutara (1), Judah Paul Makonye* (2)
(1: Chris J. Botha Secondary School; 2: University of the Witwatersrand)
LEARNERS’ USE OF PROBABILITY MODELS IN ANSWERING PROBABILITY TASKS IN SOUTH AFRICA

Roberto Alves Oliveira* (Batista Renzi State School)
THE TEACHING OF PROBABILITY IN CONTEXT THROUGH READING AND WRITING STRATEGIES AT SECONDARY EDUCATION

Maria del Mar López-Martín, Carmen Batanero*, José Miguel Contreras, Juan Jesús Ortiz (University of Granada)
CHARACTERIZING THE PROBABILITY PROBLEMS PROPOSED IN THE ENTRANCE TO UNIVERSITY TESTS IN ANDALUCIA

Haneet Gandhi* (University of Delhi)
UNDERSTANDING CHILDREN’S CONCEPTION OF RANDOMNESS THROUGH EXPLORATIONS WITH SYMMETRICAL POLYHEDRONS

Fourth Session: Saturday, 30 July 2016, 12.00–13.30
Location: K: purple, Law Building, room 18/19
Session Chair: Egan Chernoff

Presentations: Rolf Biehler* (Universität Paderborn)
PROFESSIONAL DEVELOPMENT FOR TEACHING PROBABILITY AND INFERENCE STATISTICS WITH DIGITAL TOOLS AT UPPER SECONDARY LEVEL

Per Nilsson* (1), Andreas Eckert (2)
(1: Örebro Universitet; 2: Linnaeus University)
INTERACTIVE EXPERIMENTATION IN PROBABILITY – OPPORTUNITIES, CHALLENGES AND NEEDS OF RESEARCH

Rink Hoekstra* (University of Groningen)
RISK AS AN EXPLANATORY FACTOR FOR RESEARCHERS’ INFERENTIAL INTERPRETATIONS
TSG 15 – Teaching and learning of statistics

Co-chairs: Dani Ben-Zvi (Israel), Gail Burrill (USA)
Team members: Andreas Eichler (Germany), Dave Pratt (UK), Lucia Zapata-Cardona (Columbia)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: E: mint, Economical Building, room 0079
Session Chairs: Gail Burrill, Dani Ben-Zvi

Presentations: Keren Aridor*, Dani Ben-Zvi
(The University of Haifa)
STUDENTS’ AGGREGATE REASONING WITH COVARIATION

Gail Burrill*
(Michigan State University)
THE ROLE OF TECHNOLOGY IN BUILDING STUDENT UNDERSTANDING OF FUNDAMENTAL CONCEPTS IN STATISTICS

Andreas Eichler* (1), Alexandra Sturm (2)
(1: University Kassel; 2: University of Education Freiburg)
STATISTICS TEACHERS’ AFFECT – ATTITUDES, BELIEFS, MOTIVATION

Lucia Zapata-Cardona*, Luis Miguel Marrugo-Escobar
(Universidad de Antioquia)
CRITICAL CITIZENSHIP IN COLOMBIAN STATISTICS TEXTBOOKS

Second Session: Wednesday, 27 July 2016, 12.00–13.30
Location: E: mint, Economical Building, room 0079
Group A – Session Chair: Andreas Eichler

Presentations: Pip Arnold* (1), Maxine Pfannkuch (2)
(1: Cognition Education Limited; 2: The University of Auckland)
POsing COMPARATIVE INVESTIGATIVE QUESTIONS

Yoon-Kyung Lee* (1), Cheong-Soo Cho (2)
(1: Graduate School; 2: Yeungnam University)
AN ANALYSIS OF STATISTICS CLASSROOM DISCOURSE BY PEIRCE’S ABDUCTION AND TOULMIN’S ARGUMENT PATTERN

José Antonio Orta Amaro* (1), Ernesto Alonso Sánchez (2)
(1: Escuela Nacional para Maestras de Jardines de Niños; 2: Departamento de Matemática Educativa)
MIDDLE SCHOOL STUDENTS’ REASONING ABOUT VARIATION IN RISK CONTEXTS

Travis Weiland*
(University of Massachusetts Dartmouth)
CRITICAL STATISTICAL LITERACY IN SCHOOL MATHEMATICS
**Location:** E: mint, Economical Building, room 0077  
**Group B – Session Chair: Dave Pratt**

Presentations: Christian Büsscher*  
(TU Dortmund University)  
**STUDENTS’ INFORMAL MEASURES BETWEEN OBJECTS AND TOOLS**

Virginia Anne Kinnear*, Julie Ann Clark  
(Flinders University)  
**YOUNG CHILDREN’S ABDUCTIVE REASONING ABOUT DATA**

Rima A. Sibai*, Iman Osta  
(Lebanese American University (LAU))  
**A STUDY OF STATISTICAL LITERACY IN A MATH CURRICULUM**

Hiroto Fukuda*  
(Hiroshima University)  
**LIMITATION OF CAUSAL INQUIRY IN STATISTICS EDUCATION AND IDEA FOR OVERCOMING THE LIMITATION**

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**Third Session: Friday, 29 July 2016, 12.00 –13.30**  
**Location: E: mint, Economical Building, room 0079**  
**Group A – Session Chair: Dave Pratt**

Presentations: Stephanie Budgett*, Maxine Pfannkuch  
(University of Auckland)  
**VISUALIZING CHANCE: TACKLING CONDITIONAL PROBABILITY MISCONCEPTIONS**

Khairiani Idris* (1,2), Kai-Lin Yang (1)  
(1: National Taiwan Normal University; 2: Islamic College of Malikussaleh Lhokseumawe)  
**A STUDY OF PRESERVICE EFL TEACHERS VALUES ON LEARNING STATISTICS**

Jennifer Noll*  
(Portland State University)  
**A CASE STUDY OF A STUDENT’S STATISTICAL MODELING WITH TINKERPLOTS**

Zeynep Medine Özmen*, Adnan Baki  
(Karadeniz Technical University)  
**COMPARING THE STATISTICAL LITERACY OF STUDENTS IN DIFFERENT UNDERGRADUATE PROGRAMS IN TERMS OF STATISTICAL PROCESS**

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**Location:** E: mint, Economical Building, room 0077  
**Group B – Session Chair: Lucia Zapata-Cardona**

Presentations: Daniel Frischmeier*  
(University of Paderborn)  
**STATISTICAL REASONING OF PRESERVICE TEACHERS WHEN COMPARING GROUPS WITH TINKERPLOTS**

Sandra Renee Madden*  
(University of Massachusetts Amherst)  
**EXPLORING SECONDARY TEACHER STATISTICAL LEARNING IN A BLENDED FORMAT STATISTICS AND MODELING COURSE**
**TEACHERS’ PERSPECTIVES ON TASKS AND TECHNOLOGY TO PROMOTE STATISTICAL REASONING**

Sylvain Vermette*, Mathieu Séguin
(Université du Québec à Trois-Rivières)
TEACHERS’ STATISTICAL KNOWLEDGE: THE CASE OF VARIABILITY

**Fourth Session: Saturday, 30 July 2016, 12.00–13.30**
**Location: E: mint, Economical Building, room 0079**
Session Chairs: Gail Burrill, Dani Ben-Zvi

Presentations: Susan A. Peters*, Amy Stokes-Levine
(University of Louisville)
TEACHER LEARNING: MEASURES OF VARIATION

Dave Pratt* (1), Graham Griffiths (1), David Jennings (2), Seb Schmoller (2)
(1: University College London; 2: Independent consultant)
TENSIONS AND COMPROMISES IN THE DESIGN OF A MOOC FOR ADULT LEARNERS OF MATHEMATICS AND STATISTICS

Maike Schindler*, Abdel Seidou
(Örebro University)
INFERENTIALISM IN STATISTICS EDUCATION RESEARCH

**TSG 16 – Teaching and learning of calculus**

Co-chairs: David Bressoud (USA), Victor Martinez-Luaces (Uruguay)
Team members: Imène Ghedamsi (Tunisia), Günter Törner (Germany)

**First Session: Tuesday, 26 July 2016, 12.00–13.30**
**Location: I: blue, Philosophical Tower, lecture hall C**
Session Chair: Günter Törner

Presentations: David Bressoud* (1), Naneh Apkarian (2), Jessica Ellis (3), Estrella Johnson (4),
Sean Larsen (5), Chris Rasmussen (2)
(1: Macalester College; 2: San Diego State University; 3: Colorado State University; 4: Virginia Tech; 5: Portland State University)
EFFECTING CHANGE IN THE TEACHING AND LEARNING OF CALCULUS

Nadia Hardy, Sarah Mathieu-Soucy*
(Concordia University)
WHAT IS MATHEMATICAL THEORY AND WHAT IT IS USEFUL FOR:
THE VIEWS OF UNIVERSITY CALCULUS’ STUDENTS

Oh Nam Kwon (1), YoungGon Bae* (2), Kuk Hwan Oh (1)
(1: Seoul National University; 2: Michigan State University)
DESIGN RESEARCH ON DEVELOPING INQUIRY-BASED MULTIVARIABLE CALCULUS IN FLIPPED CLASSROOM
**Second Session: Wednesday, 27 July 2016, 12.00 – 13.30**

**Location:** I: blue, Philosophical Tower, lecture hall C

**Session Chair:** Imène Ghedamsi

**Presentations:**
- Victor *Martinez-Luaces* *(FJR-Fing)*  
  CALCULUS INVERSE MODELLING PROBLEMS IN TEACHER TRAINING COURSES
- David C. *Webb* *(University of Colorado Boulder)*  
  APPLYING PRINCIPLES FOR ACTIVE LEARNING TO PROMOTE STUDENT ENGAGEMENT IN UNDERGRADUATE CALCULUS
- Yuliya *Melnikova* *(Indiana University of Pennsylvania)*  
  THE PURPOSE AND PRACTICE OF CALCULUS I LABS: ALIGNMENT IN STUDENTS, TEACHING ASSISTANTS, AND INSTRUCTORS

**Third Session: Friday, 29 July 2016, 12.00 – 13.30**

**Location:** I: blue, Philosophical Tower, lecture hall C

**Session Chair:** Victor *Martinez-Luaces*

**Presentations:**
- Imène *Ghedamsi* *(University of Tunis)*  
  IMPACT OF TEACHER MANAGEMENT OF LEARNING SEQUENCE CONVERGENCE ON THE DEVELOPMENT OF STUDENTS’ IMAGES
- Vilma *Mesa*, Nina *White*, Sarah *Sobek* *(University of Michigan)*  
  CALCULUS I TEACHING: WHAT CAN WE LEARN FROM SNAPSHOTs OF LESSONS FROM 18 SUCCESSFUL INSTITUTIONS?
- Jacqueline Rene *Coomes*, Hyung Sook *Lee* *(Eastern Washington University)*  
  COORDINATING SYMBOLIC AND GRAPHICAL MEANINGS OF FUNCTION NOTATION
- Kevin C. *Moore* *(1)*, Patrick W. *Thompson* *(2)*  
  (1: University of Georgia; 2: Arizona State University)  
  CALCULUS AND GRAPHS AS EMERGENT TRACES

**Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30**

**Location:** I: blue, Philosophical Tower, lecture hall C

**Session Chair:** David *Bressoud*

**Presentations:**
- Isabelle *Bloch* *(University of Bordeaux)*  
  A GAP AT THE TRANSITION SECONDARY/TERTIARY LEVEL: PARAMETRIC CURVES AND RESEARCH OF LIMITS
Claudio Eduardo Fuentealba Aguilera* (1,2), Edelmira Rosa Badillo Jiménez (2),
Gloria María Sánchez-Matamoros García (3), María Trigueros Gaisman (4)
(1: Universidad Austral de Chile; 2: Universidad Autónoma de Barcelona; 3: Universidad de Sevilla;
4: Instituto Tecnológico Autónomo de México)
THE DERIVATIVE IN UNIVERSITY MATH:
TASKS THAT ALLOW OBSERVATION OF HIGH LEVELS OF UNDERSTANDING

Tolga Kabaca* (1), Ali Delice (2), Mahmut Kertil (2), Gülseren Karagoz Akar (3)
(1: Pamukkale University; 2: Marmara University; 3: Bogazici University)
A JOURNEY TO INTEGRATION: PROMOTING A ROBUST CONCEPTION OF INTEGRAL

TSG 17 – Teaching and learning of discrete mathematics (including logic, game theory and algorithms)

Co-chairs: Eric Hart (USA), Cecile O. Buffet (France)
Team members: Hans-Wolfgang Henn (Germany), Jim Sandefur (USA), Ahmed Semri (Algeria)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: E: mint, Economical Building, room 3030
Session Chairs: Eric W. Hart, James Sandefur

Presentations: Robert Devaney*
(Department of Mathematics and Statistics)
DISCRETE DYNAMICAL SYSTEMS: A PATHWAY FOR STUDENTS TO BECOME ENCHANTED WITH MATHEMATICS

Gerald Alan Goldin*
(Rutgers University)
DISCRETE MATHEMATICS AND THE AFFECTIVE DIMENSION OF MATHEMATICAL LEARNING AND ENGAGEMENT

Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: E: mint, Economical Building, room 3030
Session Chairs: James Sandefur, Eric W. Hart

Presentations: Eric W. Hart*
(Grand View University)
DISCRETE MATHEMATICAL MODELING IN THE SECONDARY CURRICULUM

Solomon Garfunkel*
(COMAP)
FAIRNESS

Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: E: mint, Economical Building, room 3030
Session Chairs: Eric W. Hart, James Sandefur

Presentations: Margaret Cozzens*
(Rutgers)
FOOD WEBS, GRAPHS, AND A 60-YEAR OLD PROBLEM STUDENTS CAN HELP SOLVE
TSG 18 – Reasoning and proof in mathematics education

Co-chairs: Guershon Harel (USA), Andreas Stylianides (UK)
Team members: Paolo Boero (Italy), Mikio Miyazaki (Japan), David Reid (Germany/Canada)

First Session: Tuesday, 26 July 2016, 12.00 – 13.30
Location: I: blue, Philosophical Tower, lecture hall B
Session Chair: Andreas Stylianides

Presentations: Gila Hanna* (OISE)
REFLECTIONS ON PROOF AS EXPLANATION

Viviane Durand-Guerrier* (1), Denis Tanguay (2)
(1: University of MONTPELLIER; 2: Université du Québec à Montréal)
WORKING ON PROOFS AS CONTRIBUTING TO CONCEPTUALIZATION – THE CASE OF IR COMPLETENESS PROLEGOMENA TO A DIDACTICAL STUDY

Guershon Harel*
(University of California)
TYPES OF EPISTEMOLOGICAL JUSTIFICATIONS

Paolo Boero*, Giuseppina Fenaroli, Elda Guala
(Università di Genova)
REASONING AND PROOF IN ELEMENTARY TEACHER EDUCATION: THE KEY ROLE OF THE CULTURAL ANALYSIS OF THE CONTENT
Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: I: blue, Philosophical Tower, lecture hall B
Session Chair: Guershon Harel

Presentations: Maria Alessandra Mariotti* (1), Manuel Goiuzueta (2)
(1: University of Siena Italy; 2: Pontificia Universidad Católica de Valparaíso)
CONSTRUCTING AND VALIDATING A MATHEMATICAL MODEL: THE TEACHER’S PROMPT
Andreas J. Stylianides*, Gabriel J. Stylianides
(University of Cambridge)
CLASSROOM-BASED INTERVENTIONS IN THE AREA OF PROOF:
ADDRESSING KEY AND PERSISTENT PROBLEMS OF STUDENTS’ LEARNING
Mikio Miyazaki* (1), Junichiro Nagata (2), Kimiho Chino (1), Taro Fujita (3), Daisuke Ichikawa (4),
Shizumi Shimizu (5), Yasuo Iwanaga (1)
(1: Shinshu University; 2: Bunkyo; 3: Exeter University;
4: Attached Nagano Junior High School of Shinshu University; 5: Tekiyo University)
DEVELOPING A CURRICULUM FOR EXPLORATIVE PROVING IN LOWER SECONDARY
SCHOOL GEOMETRY
Kotaro Komatsu* (1), Tomoyuki Ishikawa (2), Akito Narazaki (3)
(1: Shinshu University; 2: Nagano Municipal High School; 3: Tojaku High School)
PROOF VALIDATION AND MODIFICATION BY EXAMPLE GENERATION:
A CLASSROOM-BASED INTERVENTION IN SECONDARY SCHOOL GEOMETRY

Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: I: blue, Philosophical Tower, lecture hall B
Group A – Session Chair: Andreas Stylianides

Presentations: Kathleen Mary Melhuish (1), Eva Thanheiser* (2)
(1: Teachers Development Group; 2: Portland State University)
TEACHER NOTICING OF JUSTIFYING IN THE ELEMENTARY CLASSROOM
Bettina Pedemonte*
(San Jose State University)
HOW CAN A TEACHER SUPPORT STUDENTS IN CONSTRUCTING A PROOF?
Leander Kempen*
(University of Paderborn)
HOW DO PRE-SERVICE TEACHERS RATE THE CONVICTION, VERIFICATION
AND EXPLANATORY POWER OF DIFFERENT KINDS OF PROOFS
Kwong Cheong Wong* (1), Rosamund Sutherland (2)
(1: The Hong Kong Polytechnic University; 2: University of Bristol; 2: University of Bristol)
REASONING-AND-PROVING IN SCHOOL MATHEMATICS TEXTBOOKS:
A CASE STUDY FROM HONG KONG
Jon D. Davis*
(Western Michigan University)
IRISH TEACHERS’ PERCEPTIONS OF REASONING-AND-PROVING AMIDST
A NATIONAL EDUCATIONAL REFORM
**Location:** I: blue, Philosophical Tower, room 756  
**Group B** – Session Chair: Guershon Harel

Presentations: Xiaoheng Yan* (1), Gila Hanna (1), John Mason (2)  
(1: OISE; 2: Oxford University)  
**IDENTIFYING AND USING KEY IDEAS IN PROOFS**

Silke Lekaus*, Gjert-Anders Askevold  
(Bergen University College)  
**MATHEMATICAL ARGUMENTATION IN PUPILS’ WRITTEN DIALOGUES**

Tina Kathleen Rapke*, Amanda Allan  
(York University)  
**WHAT MAKES A GOOD PROOF? STUDENTS EVALUATING AND PROVIDING FEEDBACK ON STUDENT-GENERATED “PROOFS”**

Yosuke Tsujiyama* (1), Koki Yui (2)  
(1: Keio University; 2: Shioda Junior High School)  
**USE OF EXAMPLES OF UNSUCCESSFUL ARGUMENTS TO FACILITATE STUDENTS’ REFLECTION ON THEIR PROVING PROCESSES**

Shiv Smith Karunakaran*  
(Washington State University)  
**ALLOWANCE BY EXPERTS FOR A BREAK IN “LINEARITY” OF DEDUCTIVE LOGIC IN THE PROCESS OF PROVING**

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**Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30**  
**Location:** I: blue, Philosophical Tower, lecture hall B  
Session Chairs: Andreas Stylianidesm, Guershon Harel

Presentations: Eric Knuth* (1), Amy Ellis (1), Orit Zaslavsky (2)  
(1: University of Wisconsin; 2: New York University)  
**THE ROLE OF EXAMPLES IN PROVING RELATED ACTIVITIES**

David A. Reid (1), Estela Aurora Vallejo Vargas* (2)  
(1: University of Bremen; 2: Pontifical Catholic University of Peru)  
**WHEN IS A GENERIC ARGUMENT A PROOF?**

Orly Buchbinder*  
(University of New Hampshire)  
**SYSTEMATIC EXPLORATION OF EXAMPLES AS PROOF: ANALYSIS FROM FOUR THEORETICAL PERSPECTIVES**
TSG 19 – Problem solving in mathematics education

Co-chairs: Peter Liljedahl (Canada), Manuel Santos Trigo (Mexico)
Team members: Uldarico Malaspina (Peru), Guido Pinkernell (Germany), Laurent Vivier (France)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: E: mint, Economical Building, room 3136/3142
Session Chairs: Peter Liljedahl, Manuel Santos

Presentations: Wes Maciejewski*, Bill Barton
(University of Auckland)
A FRAMEWORK FOR UNDERGRADUATE STUDENTS’ MATHEMATICAL FORESIGHT

Hartono Tjoe*
(The Pennsylvania State University)
LOOKING BACK TO SOLVE DIFFERENTLY: FAMILIARITY, FLUENCY, AND FLEXIBILITY

Second Session: Wednesday, 27 July 2016, 12.00 –13.30
Location: E: mint, Economical Building, room 3136/3142
Session Chair: Manuel Santos

Presentations: Peter Liljedahl*
(Simon Fraser University)
CLASSROOM PRACTICES FOR SUPPORTING PROBLEM SOLVING

Aoife Marie Guerin*, Olivia Fitzmaurice, John O’Donoghue
(University of Limerick)
PRE SERVICE TEACHERS’ PROBLEM SOLVING ABILITY IN SECONDARY LEVEL

Katalin Gosztonyi*
(University of Szeged (Hungary) and University Paris Diderot (France))
PROBLEM SOLVING IN VARGA’S REFORM OF HUNGARIAN MATHEMATICS EDUCATION: THE CASE OF COMBINATORICS

Third Session: Friday, 29 July 2016, 12.00 –13.30
Location: E: mint, Economical Building, room 3136/3142
Group A – Session Chair: Peter Liljedahl

Presentations: Maud Chanudet*
(Université de Genève)
ASSESSING IBME WITH SUMMATIVE AND FORMATIVE PURPOSE

Pietro Di Martino, Giulia Signorini*
(University of Pisa)
BEYOND THE STANDARDIZED ASSESSMENT OF PROBLEM SOLVING FROM PRODUCTS TO PROCESSES

James A. Mendoza Epperson*, Kathryn Rhoads, R. Cavender Campbell
(The University of Texas at Arlington)
TOWARD DEVELOPING AN INSTRUMENT TO ASSESS MATHEMATICAL PROBLEM SOLVING
Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30
Location: E: mint, Economical Building, room 3136/3142
Session Chairs: Peter Liljedahl, Manuel Santos

Presentations: Hélia Jacinto (1,2), Susana Carreira* (2,3)
(1: Jorge Peixinho Secondary School; 2:UIDEF, University of Lisbon; 3: University of Algarve)
MATHEMATICAL PROBLEM SOLVING WITH TECHNOLOGY: THE CASE OF MARCO SOLVING-AND-EXPRESSING ON THE SCREEN

Nélia Amado* (1,2), Susana Carreira (1,2), Sandra Nobre (2,3)
(1: University of Algarve; 2: Research Unit of the Institute of Education; 3: Group of Schools Paula Nogueira)
THE SPREADSHEET AFFORDANCES IN SOLVING INTRICATE ALGEBRAIC PROBLEMS

TSG 20 – Visualisation in the teaching and learning of mathematics

Co-chairs: Ferdinand Rivera (USA), Michal Yerushalmy (Israel)
Team members: Boon Liang Chua (Singapore), Elke Söbbeke (Germany), Isabel Vale (Portugal)

First Session: Tuesday, 26 July 2016, 12.00 – 13.30
Location: E: mint, Economical Building, room 3016
Session Chair: Michal Yerushalmy

Presentations: Joachim Frans*
(Free University Brussels)
THE EXPLANATORY VALUE OF MATHEMATICAL VISUALISATIONS: A PHILOSOPHICAL AND PRAGMATIC APPROACH

Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: E: mint, Economical Building, room 3016
Group A – Session Chair: Michal Yerushalmy

Presentations: Amy Lin*
(Brock University)
GO FIGURE: CAN ACTIONS PROMOTE VISUAL AND SPATIAL REASONING?
Natthapoj Vincent Trakulphadetkrai*
(Institute of Education)
ENHANCING CHILDREN’S VISUALISATION OF MULTIPLICATION THROUGH THEIR SELF-GENERATED MATHEMATICS PICTURE BOOKS

Location: E: mint, Economical Building, room 3017
Group B – Session Chair: Boon Liang Chua

Presentations: Isabel Vale, Teresa Pimentel*, Ana Barbosa
(School of Education of the Polytechnic Institute of Viana do Castelo)
SEEING: AN INTUITIVE AND CREATIVE WAY TO SOLVE A PROBLEM

Ana Barbosa* (1), Isabel Vale (2)
(1: School of Education of Viana do Castelo; 2: School of Education of Viana do Castelo)
VISUAL PATTERNS: A CREATIVE PATH TO GENERALIZATION

Carolina Andrea Henríquez Rivas*
(Universidad de La Frontera)
THE ROLE OF VISUALIZATION IN THE MATHEMATICAL WORKING SPACE OF TEACHERS: DIFFERENTIATION OF REASONING

Third Session: Friday, 29 July 2016, 12.00–13.30
Location: E: mint, Economical Building, room 3016
Group A – Session Chair: Isabel Vale

Presentations: Katia Vigo Ingar* (1), Maria Jose Ferreira da Silva (2)
(1: PUCP; 2: PUCSP)
APPREHENSIONS IN THE GRAPHIC REGISTER OF TWO VARIABLES FUNCTIONS

Jonathan Muzangwa* (1), Ugorjio Ogbonnaya (2), David Mogari (3)
(1: Great Zimbabwe University; 2: Tshwane University of Technology; 3: University of South Africa)
ANALYZING STUDENTS’ VISUAL THINKING IN SOLVING SELECTED CONCEPTS OF MATHEMATICAL ANALYSIS INVOLVING THE CONCEPT OF INFINITY

Mikaël Mayer*, Lucas Willems
(EPFL)
REFLEX: AN EDUCATIONAL REPRESENTATION OF COMPLEX FUNCTIONS

Location: E: mint, Economical Building, room 3017
Group B – Session Chair: Boon Liang Chua

Presentations: Rabih Raif El Mouhayar*
(American University of Beirut)
THE RELATIONSHIP BETWEEN TEACHER LENS AND TEACHER NOTICING OF STUDENTS’ STRATEGIES IN FIGURAL PATTERNS
Nazan Sezen Yüksel*, Ali Bülbül
(HACETTEPE UNIVERSITY)
INVESTIGATION OF DEVELOPMENT ON MENTAL CUTTING ABILITY BY LATENT GROWTH MODEL

Ulrike Dreher*, Timo Leuders, Lars Holzäpfel
(University of Education Freiburg)
FACTORS THAT INFLUENCE REPRESENTATIONAL CHOICE: STUDENTS’ MATHEMATICAL ABILITIES, SELF-EFFICACY AND PREFERENCE

Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30
Location: E: mint, Economical Building, room 3016
Session Chairs: Boon Liang Chua, Isabel Vale

Presentations: Johanna Hendrina Kotze*, Gerrie J. Jacobs, Erica D. Spangenberg
(University of Johannesburg)
ELICITING VISUALISATION WITH TECHNO-MODELLING TASKS

Juan D. Godino (1), Belén Giacomone* (1), Miguel R. Wilhelmi (2), Teresa F. Blanco (3),
Angel Contreras (4)
(1: University of Granada; 2: Public University of Navarra; 3: University of Santiago de Compostela;
4: University of Jaén)
ONTO-SEMIOTIC ANALYSIS OF VISUALIZATION AND DIAGRAMMATIC REASONING TASKS

TSG 21 – Mathematical applications and modelling in the teaching and learning of mathematics

Co-chairs: Jussara Araújo (Brazil), Gloria Stillman (Australia)
Team members: Morten Blomhøj (Denmark), Dominik Leiss (Germany), Toshikazu Ikeda (Japan)

First Session: Tuesday, 26 July 2016, 12.00 – 13.30
Location: C: turquoise, Main Building, lecture hall J
Session Chair: Jussara Araújo

Presentations: Gloria Ann Stillman*
(Australian Catholic University)
STATE OF THE ART ON MODELLING IN MATHEMATICS EDUCATION

Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: C: turquoise, Main Building, lecture hall J
Group A – Session Chair: Morten Blomhøj

Presentations: France Caron* (1), Miroslav Lovric (2)
(1: Université de Montréal, 2: McMaster University)
APPROACHES TO INVESTIGATING COMPLEX DYNAMICAL SYSTEMS
Topic Study Groups

Ibtisam Abedelhalek Zubi, Irit Peled*
(University of Haifa)
SHIFTS IN KNOWLEDGE AND PARTICIPATION OF CHILDREN WITH MATHEMATICAL DIFFICULTIES WORKING ON MODELLING TASKS

Dung Tran*, Phuong Ta, An Nguyen, Duyen Nguyen, Giang Nguyen
(Hue University College of Education)
AUTHENTICITY OF MODELLING TASKS AND STUDENTS’ PROBLEM SOLVING

Miriam Ortega* (1), Lluís Albarracín (2), Luis Puig (1)
(1: Universitat de València; 2: Universitat Autònoma de Barcelona)
INFLUENCE OF TECHNOLOGY ON MATHEMATICAL MODELLING OF A PHYSICAL PHENOMENON

Location: C: turquoise, Main Building, lecture hall M
Group B – Session Chair: Toshikazu Ikeda

Presentations: Takashi Kawakami* (1), Janeen Lamb (2), Akio Matsuzaki (3), Akihiko Saeki (4)
(1: Nishikyushu University; 2: Australian Catholic University; 3: Saitama University;
4: Naruto University of Education)
MERGING OF TASK CONTEXTS AND MATHEMATICS IN DUAL MODELLING TEACHING: CASE STUDIES IN JAPAN AND AUSTRALIA

Jill P. Brown*
(Australian Catholic University)
WHAT DO WE MEAN BY ‘CONTEXT’?

Andreas Busse*
(Universität Hamburg)
THE NEGATIVE IMPACT OF THE NEW GERMAN EXAMINATION TASKS ON THE MODELLING CLASSROOM IN HAMBURG

Corinna Hertleif*, Catharina Adamek, Gilbert Greefrath
(WWU Münster)
ASSESSING SUB-COMPETENCIES OF MATHEMATICAL MODELLING IN THE LIMO PROJECT

Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: C: turquoise, Main Building, lecture hall J
Group A – Session Chair: Dominik Leiss

Presentations: Xenia-Rosemarie Reit*
(Goethe-University Frankfurt)
THE POTENTIAL OF COGNITIVE STRUCTURES IN SOLUTION APPROACHES OF MODELLING TASKS

Jennifer Ann Czocher*
(Texas State University)
MAKING SENSE OF STUDENT-GENERATED CONDITIONS AND ASSUMPTIONS
Angeles Dominguez*, Jorge Eugenio de la Garza Becerra (Tecnologico de Monterrey)
MODEL APPLICATION ACTIVITY: INTEGRATION OF CONCEPTS AND MODELS

Toshikazu Ikeda* (Yokohama National University)
ORGANIZING MATHEMATICAL MODELLING IN JAPANESE MATHEMATICS CURRICULUM

Location: C: turquoise, Main Building, lecture hall M
Group B – Session Chairs: Jill P. Brown

Presentations: Juhaina Awawdeh Shahbari* (1,2), Michal Tabach (1)
(1: Tel-Aviv University; 2: Al-Qasemi Academy)
ADAPTING A COGNITIVE TOOL FOR REPRESENTING TEACHERS’ INTERPRETATIONS OF STUDENTS’ MODELLING ACTIVITIES

Peter Stender* (Universität Hamburg)
HEURISTIC STRATEGIES IN MODELING PROBLEMS

Elizabeth W. Fulton*, Megan H. Wickstrom, Elizabeth A. Burroughs, Mary Alice Carlson (Montana State University)
TEACHERS AS LEARNERS: UNDERSTANDING AND VALUING MATHEMATICAL MODELING THROUGH PROFESSIONAL DEVELOPMENT

Joo Young Park* (Florida Institute of Technology)
PRE-SERVICE MATHEMATICS TEACHERS PROJECT-BASED MATHEMATICAL MODELING INSTRUCTION: CONCEPTON, TASK DESIGN, AND ENACTMENT

Fourth Session: Saturday, 30 July 2016, 12.00–13.30
Location: C: turquoise, Main Building, lecture hall J
Session Chair: Gloria Ann Stillman

Presentations: Jussara Araújo* (Universidade Federal de Minas Gerais)
TOWARD A FRAMEWORK FOR A DIALECTICAL RELATIONSHIP BETWEEN PEDAGOGICAL PRACTICE AND RESEARCH

Morten Blomhøj* (Roskilde University)
INTERPLAY BETWEEN RESEARCH AND DEVELOPMENT OF TEACHING PRACTICES IN MATHEMATICAL MODELLING
**TSG 22 – Interdisciplinary mathematics education**

Co-chairs: Susie Groves (Australia), Julian Williams (UK)
Team members: Rita Borromeo Ferri (Germany), Brian Doig (Australia), Nicholas Mousoulides (Cyprus)

**First Session: Tuesday, 26 July 2016, 12.00–13.30**
**Location: E: mint, Economical Building, room 0029**
Session Chair: Susie Groves

Presentations: Julian Williams* (1), Wolff-Michael Roth (2)
(1: University of Manchester; 2: University of Victoria)
**THEORY OF DISCIPLINARITY AND INTERDISCIPLINARY ACTIVITY: COMMUNITIES, BOUNDARIES, VOICES AND HYBRIDITY**

Russell William Tytler*
(Deakin University)
**CHALLENGES FOR MATHEMATICS WITHIN AN INTERDISCIPLINARY STEM EDUCATION**

Brian Doig*, Wendy Jobling
(Deakin University)
**INTER-DISCIPLINARY MATHEMATICS: OLD WINE IN NEW BOTTLES?**

**Second Session: Wednesday, 27 July 2016, 12.00–13.30**
**Location: E: mint, Economical Building, room 0029**
Session Chair: Rita Borromeo-Ferri

Presentations: Nicholas Mousoulides*
(University of Nicosia)
**A MODELLING PERSPECTIVE IN DESIGNING INTERDISCIPLINARY PROFESSIONAL LEARNING COMMUNITIES**

Nelleke Sussanna den Braber* (1), Jenneke Krüger (2), Marco Mazereeuw (1), Wilmad Kuiper (2)
(1: NHL University of Applied Sciences; 2: Freudenthal Institute)
**MATHEMATICS IN AN INTERDISCIPLINARY STEM COURSE (NLT) IN THE NETHERLANDS**

Fatma Aslan-Tutak*, Sevil Akaygun
(Bogazici University)
**PRESERVICE MATHEMATICS TEACHERS’ INTERDISCIPLINARY WORK FOR STEM EDUCATION**

**Third Session: Friday, 29 July 2016, 12.00–13.30**
**Location: E: mint, Economical Building, room 0029**
Session Chair: Nicholas Mousoulides

Presentations: Andrzej Sokolowski*
(Lone Star System – Montgomery)
**SCIENTIFIC INQUIRY IN MATHEMATICS AND STEM EDUCATION**

Michael Erotoma Omuvwie*
(University of Manchester)
**USING REAL-LIFE CONTEXT AS AN AID FOR MATHEMATICS TEACHING AND LEARNING**
Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30
Location: E: mint, Economical Building, room 0029
Session Chair: Julian Williams

Presentations: Rita Borromeo-Ferri* (1), Andreas Meister (2), Detlef Kuhl (3), Astrid Hülsmann (4)
(1: University of Kassel; 2: University of Kassel; 3: University of Kassel; 4: Freelance Sculpture Artist)
INSPIRED BY LEONARDO DA VINCI – STEM LEARNING FOR PRIMARY AND SECONDARY SCHOOL WITH THE CROSS-LINK APPROACH

Maria Alicia Venegas Thayer*
(Pontifical Catholic University of Valparaiso)
INTERDISCIPLINARY COLLABORATION BETWEEN MUSICIANS AND MATHEMATICIANS: AN EXPERIENCE WITH STOCHASTIC MUSIC

David Swanson*
(The University of Manchester)
RATIO AND PROPORTION IN SECONDARY SCHOOL SCIENCE

TSG 23 – Mathematical literacy

Co-chairs: Iddo Gal (Israel), Hamsa Venkat (SA)
Team members: Vince Geiger (Australia), Eva Jablonka (UK), Markus Helmerich (Germany)

First Session: Tuesday, 26 July 2016, 12.00 – 13.30
Location: H: orange, Educational Building, room 209
Session Chairs: Hamsa Venkat, Iddo Gal

Presentations: Vince Geiger* (1), Merrilyn Goos (2), Helen Forgasz (3)
(1: Australian Catholic University; 2: The University of Queensland; 3: Monash University)
MATHEMATICAL LITERACY (NUMERACY) FROM AN INTERNATIONAL PERSPECTIVE

Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: H: orange, Educational Building, room 209
Session Chairs: Iddo Gal, Hamsa Venkat

Presentations: Eckhard Klieme*
(German Institute for International Educational Research)
LEARNING ENVIRONMENTS FOR MATHEMATICAL LITERACY IN CROSS-CULTURAL COMPARISONS
Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: H: orange, Educational Building, room 209
Group A – Session Chairs: Vince Geiger, Eva Jablonka

Presentations: Andreas Vohns*
(Alpen-Adria-Universität Klagenfurt)
MATHEMATICAL LITERACY AS A CIVIL RIGHT AND/OR A CIVIC DUTY?
TWO GENERAL EDUCATION APPROACHES

Marc North*
(University of Nottingham)
TOWARDS A THEORETICAL LANGUAGE OF DESCRIPTION OF THE KNOWLEDGE
DOMAIN OF MATHEMATICAL LITERACY: THE CASE OF SOUTH AFRICA

Joachim Engel (1), Iddo Gal* (2), Jim Ridgway (3)
(1: Ludwigsburg University of Education; 2: University of Haifa; 3: University of Durham)
MATHEMATICAL LITERACY AND CITIZEN ENGAGEMENT: THE ROLE OF CIVIC STATISTICS

Anne Bennison*
(The University of Queensland)
BOUNDARY OBJECTS AND NUMERACY ACROSS THE CURRICULUM

Location: H: orange, Educational Building, room 08
Group B – Session Chair: Markus Alexander Helmerich

Presentations: Irene Cazorla* (1), Miriam Utsumi (2)
(1: Universidade Estadual de Santa Cruz – UESC; 2: Universidade de São Paulo – USP)
REFLECTIONS ON THE POTENTIAL OF TEACHING STATISTICS IN BASIC EDUCATION
FOR WORLD READING EXTENSION

Robabeh Afkhami*, Nasim Asghary
(azad university)
EXAMINING MATHEMATICAL LITERACY OF IRANIAN ELEMENTARY STUDENTS

Mark Winter*
(University of Johannesburg)
TRAVERSING THE INTERFACE BETWEEN CONTEXTUAL AND MATHEMATICAL WORLDS
IN TEACHER LEARNING FOR MATHEMATICAL LITERACY

Yun-Zu Chen*
(National Taiwan Normal University)
CONCEPTUALIZING SPATIAL LITERACY FOR STEM EDUCATION

Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30
Location: H: orange, Educational Building, room 209
Session Chairs: Iddo Gal, Hamsa Venkat

GENERAL REACTIONS & GENERAL DISCUSSION
TSG 24 – History of the teaching and learning of mathematics

Co-chairs: Fulvia Furinghetti (Italy), Alexander Karp (USA)
Team members: Henrike Allmendinger (Germany), Johan Prytz (Sweden), Harm Jan Smid (Netherlands)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: H: orange, Educational Building, room 105
Session Chair: Alexander Karp

Presentations: Gert Schubring*
(Universidade Federal do Rio de Janeiro)
PATTERNS FOR STUDYING HISTORY OF MATHEMATICS EDUCATION: CASE STUDY OF GERMANY

Jenneke Krüger*
(university of Utrecht)
FRANS VAN SCHOOTEN SR: DUTCH GEOMETRY FOR ENGINEERS, LEIDEN, 1611–1645

Antonio M. Oller-Marcén* (1), Vicente Meavilla (2)
(1: Centro Universitario de la Defensa de Zaragoza; 2: Universidad de Zaragoza)
ARITHMETIC IN SPANISH ARMY AT THE END OF XIX CENTURY. THE WORKS BY SALINAS AND BENÍTEZ

Second Session: Wednesday, 27 July 2016, 12.00–13.30
Location: H: orange, Educational Building, room 105
Session Chair: Johan Prytz

Presentations: Marion Cousin*
(University Paris 7/SPHERE Laboratory)

Alexander Karp*
(Teachers College)
RUSSIAN MATHEMATICS TEACHERS, 1830–1880: SEVERAL EXAMPLES

Fulvia Furinghetti*
(University of Genoa)
THE PROFESSIONALIZATION OF ITALIAN PRIMARY TEACHERS THROUGH A JOURNAL ISSUED AT THE BEGINNING OF XX CENTURY

Harm Jan Smid*
(Delft University of Technology)
BECOMING A TEACHER OF MATHEMATICS IN TIMES OF CHANGE

Third Session: Friday, 29 July 2016, 12.00–13.30
Location: H: orange, Educational Building, room 105
Session Chair: Harm Jan Smid

Presentations: Johan Prytz*
(Uppsala universitet)
NEW MATH FOR BIG EDUCATION, OLD MATH FOR SMALL EDUCATION? A STUDY OF DIFFERENT WAYS TO REFORM SCHOOL MATHEMATICS
Dirk De Bock*, Geert Vanpaemel
(Katholieke Universiteit Leuven)
EARLY EXPERIMENTS WITH MODERN MATHEMATICS IN BELGIUM

Elisabete Zardo Burigo*
(Universidade Federal do Rio Grande do Sul)
REAL NUMBERS IN SCHOOL: 1960S EXPERIMENTS

Miguel Picado* (1), Luis Rico (2), Bernardo Gómez (3)
(1: National University of Costa Rica; 2: University of Granada; 3: University of Valencia)
THE METROLOGICAL REFORM IN THE SPANISH EDUCATIONAL SYSTEM IN THE 19TH CENTURY: WHO WERE THE AUTHORS OF THE TEXTBOOKS?

Fourth Session: Saturday, 30 July 2016, 12.00–13.30
Location: H: orange, Educational Building, room 105
Session Chair: Fulvia Furinghetti

Presentations: Kristín Bjarnadóttir*
(University of Iceland)
ROYAUMONT – PROPOSALS ON ARITHMETIC AND ALGEBRA TEACHING FOR LOWER-SECONDARY SCHOOL LEVEL

Sethykar SamAn*
(Royal University of Phnom Penh)
HISTORY OF MATHEMATICS INSTRUCTION IN COLONIAL CAMBODIA

Alexei K. Volkov*
(National Tsing-Hua University)
DIDACTICAL FUNCTION OF IMAGES OF COUNTING DEVICES IN CHINESE MATHEMATICAL TEXTBOOKS

Gabriella Ambrus (2), Andreas Filler* (1), Ödön Vancsó (2)
(1: Humboldt-Universitaet zu Berlin; 2: Eötvös Loránd University Budapest)
FUNCTIONAL REASONING AND WORKING WITH FUNCTIONS IN MATHEMATICS TEACHING TRADITION IN HUNGARY AND GERMANY

TSG 25 – The Role of History of Mathematics in Mathematics Education

Co-chairs: Costas Tzanakis (Greece), Xiaoqin Wang (China)
Team members: Kathleen Clark (USA), Tinne Hoff Kjeldsen (Denmark), Sebastian Schorcht (Germany)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: E: mint, Economical Building, room 2091/2201
Session Chair: Constantinos Tzanakis

Presentations: Tinne Hoff Kjeldsen, Mikkel Willum Johansen*
(University of Copenhagen)
THE HISTORY OF ARTIFACTS AS A RESOURCE IN MATHEMATICS EDUCATION
David Guillemette* (University of Ottawa)
AN EMPIRICAL STUDY CONCERNING LIVED EXPERIENCE OF PRESERVICE TEACHERS ENGAGED IN THE READING OF HISTORICAL TEXTS

Jerry M. Lodder* (New Mexico State University)
PRIMARY HISTORICAL SOURCES IN THE CLASSROOM: GRAPH THEORY AND SPANNING TREES

Snezana Lawrence* (Bath Spa University)
EUCLID’S ART AFTER BATH

**Second Session: Wednesday, 27 July 2016, 12.00–13.30**
**Location: E: mint, Economical Building, room 2091/2201**
Session Chair: Kathy Clark

Presentations: Iolanda Guevara-Casanova* (1), Carme Burgués-Flamarich (2)
(1: Universitat Autònoma Barcelona; 2: Universitat Barcelona)
GEOMETRY AND VISUAL REASONING TO INTRODUCE ALGEBRAIC LANGUAGE AS LIU HUI AND AL-KHWARIZMI DID

Aline Bernardes* (1), Tatiana Roque (2)
(1: Federal University of the State of Rio de Janeiro (UNIRIO); 2: Federal University of Rio de Janeiro (UFRJ))
HISTORY OF MATRICES: PROMOTING COMMNOGNITIVE CONFLICTS AND ENCOURAGING REFLECTION ON META-DISCURSIVE RULES IN PROSPECTIVE TEACHERS

Sebastian Schorcht*
(Primary School Kopernikusstrasse)
HISTORY OF MATHEMATICS IN TEXTBOOKS FROM FIRST TO SEVENTH GRADES – TYPES OF TASKS

Maria T. Sanz*, Bernardo Gómez
(UNIVERSIDAD DE VALENCIA)
MISSING CURIOUS FRACTION PROBLEMS: THE UNKNOWN HERITAGE AND THE UNKNOWN NUMBERS OF HEIRS

**Third Session: Friday, 29 July 2016, 12.00–13.30**
**Location: E: mint, Economical Building, room 2091/2201**
Session Chair: Tinne Hoff Kjeldsen

Presentations: Patricia Baggett* (1), Andrzej Ehrenfeucht (2)
(1: New Mexico State University; 2: University of Colorado)
INVOLVING STUDENTS IN RESEARCH IN THE HISTORY OF MATHEMATICS EDUCATION: FROM BOOK REPORT TO MAJOR PROJECT

Kristian Danielsen (2), Emilie Gertz (1), Henrik Kragh Sørensen* (1)
(1: Aarhus University; 2: Randers Statsskole)
FACILITATING AUTHENTIC HISTORY OF MATHEMATICS IN DANISH UPPER-SECONDARY MATHEMATICS EDUCATION
Qian Fang*  
(East China Normal University)  
INSTRUCTIONAL DESIGN OF BINOMIAL THEOREM FROM THE PERSPECTIVE OF HPM  

Susanne Spies*, Ingo Witzke  
(Universität Siegen)  
MAKING DOMAINSPECIFIC BELIEFS EXPLICIT FOR PROSPECTIVE TEACHERS – AN EXAMPLE OF USING ORIGINAL SOURCES  

**Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30**  
**Location:** E: mint, Economical Building, room 2091/2201  
Session Chair: Xiaoqin Wang  

Presentations: Ingo Witzke (1), Kathleen Clark* (2), Horst Struve (3), Gero Stoffels (1)  
(1: University of Siegen; 2: Florida State University; 3: University of Cologne)  
A SEMINAR DESIGNED TO ADDRESS THE TRANSITION PROBLEM FROM SCHOOL TO UNIVERSITY MATHEMATICS: INITIAL RESULTS  

Silvia Schöneburg*  
(University of Leipzig)  
THE PANTOGRAPH – A HISTORICAL DRAWING DEVICE FOR MATH TEACHING  

Ysette Weiss-Pidstrygach* (1), Rainer Kaenders (2)  
(1: Johannes Gutenberg – Universität Mainz; 2: Rheinische Friedrich-Wilhelms-Universität Bonn)  
ALGEBRA WITHOUT CONTEXT IS EMPTY, VISUALIZATIONS WITHOUT CONCEPTS ARE BLIND  

Vasiliki Tsiapou*  
(University of Western Macedonia)  
LIU HUI SHARES HIS VIEWS ABOUT MATHEMATICS WITH STUDENTS OF A GREEK PRIMARY SCHOOL  

**TSG 26 – Research on teaching and classroom practice**  

Co-chairs: Yoshinori Shimizu (Japan), Mary Kay Stein (USA)  
Team members: Birgit Brandt (Germany), Helia Oliveira (Portugal), Lijun Ye (China)  

**First Session: Tuesday, 26 July 2016, 12.00 – 13.30**  
**Location:** K: purple, Law Building, lecture hall  
Session Chairs: Mary Kay Stein, Yoshinori Shimizu  

Presentations: Daniel Chazan* (1), Patricio Herbst (2)  
(1: University of Maryland; 2: University of Michigan)  
RECONCILING TWO USES OF NORM IN MATHEMATICS EDUCATION RESEARCH
Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: K: purple, Law Building, lecture hall
Group A – Session Chair: Birgit Brandt

Presentations: Esther Alice Enright*, Lauren Ashley Hickman, Deborah Loewenberg Ball
(University of Michigan)
A TYPOLOGY OF QUESTIONS BY INSTRUCTIONAL FUNCTION

Melissa Kemmerle*
(University of Michigan)
QUESTIONS ABOUT QUESTIONS

Siún NicMhuiri*
(Dublin City University)
USING RESEARCH FRAMEWORKS TO DEVELOP PRACTICE: TEACHER QUESTIONS IN A MATH TALK COMMUNITY

Location: B: dark-brown, East Wing Building, room 123
Group B – Session Chair: Helia Oliveira

Presentations: Jeremy Zelkowski*, Jim Gleason, Stefanie D. Livers
(The University of Alabama)
MEASURING MATHEMATICS CLASSROOM INTERACTIONS: OBSERVATION PROTOCOL REINFORCING DEVELOPMENT OF CONCEPTUAL UNDERSTANDING

Lidong Wang*, Yiming Cao
(The High School Affiliated to RENMIN University of China)
USING COGNITIVE DIAGNOSTIC MODEL TO BUILD A DIFF. MODEL MEASURING MATH TEACHERS’ EFFECT ON GRADE 7 STUDENTS’ ACHIEVEMENT

Steven Watson* (1), Louis Major (1), Elizabeth Kimber (2)
(1: Faculty of Education; 2: Faculty of Mathematics)
TEACHER CHANGE IN POST-16 MATHEMATICS: A MULTIPLE CASE ANALYSIS OF TEACHERS IN THE ZONE OF ENACTMENT

Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: K: purple, Law Building, lecture hall
Group A – Session Chair: Liyun Ye

Presentations: Marika Toivola*, Harry Silfverberg
(University of Turku)
THE ESPOUSED THEORY OF ACTION OF AN EXPERT MATHEMATICS TEACHER USING FLIPPED LEARNING

Amanda Allan*, Tina Rapke, Lyndon Martin
(York University)
SETTING ASIDE: HOW TEACHERS CAN SUPPORT STUDENTS TO BUILD ON PRIOR KNOWLEDGE
Topic Study Groups

**Location: B: dark-brown, East Wing Building, room 123**

**Group B – Session Chair: Yoshinori Shimizu**

Presentations: Emily C. Kern* (1), Erin C. Henrick (1), Thomas M. Smith (2), Paul Cobb (1), Yiming Cao (3)

(1: Vanderbilt University; 2: University of California-Riverside; 3: Beijing Normal University)

**ANALYZING MIDDLE GRADES MATHEMATICS TEACHING IN THE U.S. AND CHINA: A CROSS-NATIONAL COMPARISON OF INSTRUCTIONAL QUALITY**

Sharon Marianne Calor*, Rijkje Dekker, Jannet Petronella van Drie, Bonne Zijlstra, Monique Volman

(University of Amsterdam)

**COMPARISON OF MATHEMATICS DISCUSSION AND CONVENTIONAL LESSONS IN A COLLABORATIVE SETTING**

Yu Bin Lee*, Cheong Soo Cho

(Shin Jung High School)

**STUDY OF REPRESENTATIONAL PRACTICES AND REPRESENTATIONAL ACTIVITIES OF SEC. MATH TEACHERS THROUGH ETHNOGRAPHIC STUDY**

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**Fourth Session: Saturday, 30 July 2016, 12.00–13.30**

**Location: K: purple, Law Building, lecture hall**

Session Chairs: Yoshinori Shimizu, Mary Kay Stein

Presentations: Mary Kay Stein*, Katelynn Kelly, Debra Moore, Richard Correnti, Jennifer Russell

(University of Pittsburgh)

**THEORIZING AND MEASURING TEACHING FOR CONCEPTUAL UNDERSTANDING**

Yoshinori Shimizu* (1), Yuka Funahashi (2)

(1: University of Tsukuba; 2: Nara University of Education)

**BEYOND THE LABELS: LEARNING FROM INTERNATIONAL COMPARATIVE STUDIES OF MATHEMATICS CLASSROOM PRACTICES**

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**TSG 27 – Learning and cognition in mathematics**

Co-chairs: Wim van Dooren (Belgium), Gaye Williams (Australia)

Team members: Pablo Dartnell (Chile), Anke Lindmeier (Germany), Jérôme Proulx (Canada)

**First Session: Tuesday, 26 July 2016, 12.00–13.30**

**Location: H: orange, Educational Building, room 208**

Session Chair: Wim van Dooren

Presentations: Erno Lehtinen*

(University of Turku)

**MATHEMATICAL COGNITION AND LEARNING PROCESSES: ANALYSIS OF INDIVIDUAL LEARNING TRAJECTORIES**

Jo Van Hoof*, Lieven Verschaffel, Wim Van Dooren

(KU Leuven)

**CHARACTERIZING THE DEVELOPMENT OF THE NATURAL NUMBER BIAS THROUGH PRIMARY AND SECONDARY EDUCATION**
David Maximiliano Gomez*, Pablo Dartnell  
(Universidad de Chile)  
CLUSTERING ANALYSIS AS A WINDOW INTO CHILDREN’S STRATEGIES FOR COMPARING FRACTIONS

Second Session: Wednesday, 27 July 2016, 12.00–13.30  
Location: H: orange, Educational Building, room 208  
Session Chair: Gaye Williams

Presentations: Dor Abrahamson*  
(University of California)  
THE ECOLOGICAL DYNAMICS OF MATHEMATICS EDUCATION: THE EMERGENCE OF PROPORTIONAL REASONING IN FIELDS OF PROMOTED ACTION

Anke Lindmeier*, Aiso Heinze  
(IPN Kiel)  
STRATEGIES FOR RECOGNIZING QUANTITIES IN STRUCTURED WHOLE NUMBER REPRESENTATIONS – A COMPARATIVE EYE-TRACKING STUDY

Tine Degrande*, Lieven Verschaffel, Wim Van Dooren  
(Centre for Instructional Psychology and Technology)  
RECONSIDERING SFOR: CHARACTERIZING CHILDREN’S FOCUS ON QUANTITATIVE RELATIONS

Third Session: Friday, 29 July 2016, 12.00–13.30  
Location: H: orange, Educational Building, room 208  
Session Chair: Wim Van Dooren

Presentations: Judy Anne Anderson* (1), Janette Bobis (1), Andrew Martin (2), Karen Skilling (3), Jenni Way (1)  
(1: The University of Sydney; 2: The University of New South Wales; 3: Kings College London)  
THE MIDDLE YEARS TRANSITION, ENGAGEMENT AND ACHIEVEMENT IN MATHEMATICS (MYTEAM) PROJECT

Miguel Alves Figueiredo*, Henrique Manuel Guimarães  
(Instituto de Educação – Universidade de Lisboa)  
LEARNING STYLES IN MATHEMATICS OF 10TH GRADE PORTUGUESE STUDENTS

Bishnu Khanal*  
(Mahendra Ratna Campus)  
STUDENTS’ LEARNING STRATEGIES IN MATHEMATICS

Fourth Session: Saturday, 30 July 2016, 12.00–13.30  
Location: H: orange, Educational Building, room 208  
Session Chair: Gaye Williams

Presentations: Minoru Ohtani*  
(Kanazawa University)  
ITC BASED DISCOURSE THAT AFFECTS REIFICATION OF A MATHEMATICAL OBJECT: THE CASE OF FUNCTION
P Janelle McFeetors*  
(University of Alberta)  
AUTHORING AS A METAPHOR FOR LEARNING IN MATHEMATICS

Gaye Williams*  
(Deakin University (Burwood Campus))  
INFLUENCES OF DIFFERENT PACES OF THINKING ON GROUP LEARNING IN THE ZONE OF PROXIMAL DEVELOPMENT

**TSG 28 – Affect, beliefs and identity in mathematics education**

Co-chairs: Markku Hannula (Finland), Francesca Morselli (Italy)  
Team members: Emine Erktin (Turkey), Maike Vollstedt (Germany), Qiao-Ping Zhang (Hong Kong)

**First Session: Tuesday, 26 July 2016, 12.00 – 13.30**  
**Location:** C: turquoise, Main Building, lecture hall C  
Session Chair: Francesca Morselli

Presentations: Gilah Leder*  
(Monash University)  
MATHEMATICS-RELATED BELIEFS AND AFFECT – WITH SPECIAL EMPHASIS ON GENDER: AN OVERVIEW

Emmanuel Adu-tutu Bofah*, Markku S Hannula  
(University of Helsinki)  
PERCEIVED SOCIAL SUPPORT AND ACHIEVEMENT: THE MEDIATIONAL ROLE OF MOTIVATIONAL BELIEFS

**Second Session: Wednesday, 27 July 2016, 12.00 – 13.30**  
**Location:** C: turquoise, Main Building, lecture hall C  
**Group A** – Session Chair: Qiao-Ping Zhang

Presentations: Einat Heyd-Metzuyanim*  
(Technion – Israel Institute of Technology)  
IDENTITY AS A NEXUS OF AFFECT AND DISCOURSE IN MATHEMATICAL LEARNING

Lise Westaway*  
(Rhodes University)  
SOCIAL REALISM: A FRAMEWORK FOR RESEARCHING THE EMERGENCE OF TEACHERS’ IDENTITIES

Clyde Benedict Aurelius Felix*  
(Nelson Mandela Metropolitan University)  
THE STRUGGLE FOR RECOGNITION AND THE PROFESSIONAL IDENTITIES OF MATHEMATICS TEACHERS

Andreas Karaolis*, George Filippou  
(University of Nicosia)  
TEACHERS’ PROFESSIONAL IDENTITY
Location: C: turquoise, Main Building, lecture hall H
Group B – Session Chair: Maike Vollstedt

Presentations: Zehavit Kohen* (1,2), Tali Miranda (2)
(1: Bar-Ilan University; 2: Levinsky College of Education)
SELF-EFFICACY IN LEARNING MATHEMATICS: THE EFFECT OF VISUALIZATION AND ITS MUTUAL RELATION TO STUDENTS’ ACHIEVEMENTS

Edgar Fuller*, Jessica Deshler
(West Virginia University)
THE IMPACT OF ANXIETY AND PERSONALITY ON STUDENT PERFORMANCE IN DEVELOPMENTAL MATHEMATICS COURSES

Çigdem Haser*
(Middle East Technical University)
FEELINGS OF DIFFICULTY DURING PROBLEM POSING AND SOLVING

Markku S. Hannula*, Susanna Oksanen
(University of Helsinki)
THE EFFECT OF TEACHER BELIEFS ON STUDENT AFFECT AND ACHIEVEMENT

Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: C: turquoise, Main Building, lecture hall C
Group A – Session Chair: Emine Erktin

Presentations: Deena Khalil*, Ayanna Johnson
(Howard University)
A NOVICE TEACHER’S POWERFUL MATHEMATICAL AFFECT: A CASE STUDY OF MYKIA’S TEACHLIVE™ REHEARSALS

Christin Laschke* (1), Sigrid Blömeke (2)
(1: Humboldt-Universität zu Berlin; 2: University of Oslo)
THE MEASUREMENT OF MOTIVES TO BECOME A TEACHER IN TEDS-M – TESTING FOR INVARIANCE ACROSS COUNTRIES AND CULTURES

Atinuke Adeyemi*
(University of Windsor)
MATHEMATICS ANXIETY AND MATHEMATICS TEACHING ANXIETY AMONG IN-SERVICE ELEMENTARY SCHOOL TEACHERS

Sylvester Juwe*
(University of Cambridge)
A COMPARISON OF MATHEMATICS EDUCATION BELIEFS AMONG MATHEMATICS CURRICULUM LEADERS IN ENGLAND AND NIGERIA

Location: C: turquoise, Main Building, lecture hall H
Group B – Session Chair: Birgit Pepin

Presentations: Elizar Elizar*
(The University of Adelaide)
TWO-LEVEL MODEL OF ATTITUDES AND BELIEFS INFLUENCING HIGHER ORDER THINKING (HOT) SKILLS IN MATHEMATICS
Ozge Gun* (1), Safure Bulut (2)
(1: Bartin University; 2: Middle East Technical University)
STUDENTS’ ATTITUDES TOWARD MATHEMATICS: A MODELING STUDY

Francesca Morselli* (1), Laura Branchetti (2)
(1: University of Genova; 2: University of Palermo)
THE INTERPLAY OF RATIONALITY AND IDENTITY IN A MATHEMATICAL ACTIVITY IN SECONDARY SCHOOL

Karina Joyce Wilkie*
(Monash University)
EXPLORING STUDENTS’ OWN EXPRESSIONS OF THEIR ASPIRATIONS FOR MATHEMATICS LEARNING

Fourth Session: Saturday, 30 July 2016, 12.00–13.30
Location: C: turquoise, Main Building, lecture hall C
Session Chair: Markku S. Hannula

Presentations: Barbara Pieronkiewicz* (1), Gerald Goldin (2)
(1: Pedagogical University of Cracow; 2: Rutgers University)
AFFECTIVE TRANSGRESSION AND META-AFFECT: AN EXPLORATION OF PROCESSES FOR BELIEF CHANGE IN MATHEMATICS EDUCATION

James A Middleton*, Daniel Mangu, Andrew Lee
(Arizona State University)
A LONGITUDINAL STUDY OF MATHEMATICS AND SCIENCE MOTIVATION PATTERNS FOR STEM-INTENDING HIGH SCHOOLERS IN THE US

Kay Achmetli*, Stanislaw Schukajlow
(Westfälische Wilhelms-Universität Münster)
MULTIPLE SOLUTIONS, THE EXPERIENCE OF COMPETENCE, AND INTEREST

TSG 29 – Mathematics and creativity

Co-chairs: Dace Kuma (Latvia), Demetra Pitta-Pantazi (Cyprus)
Team members: Alex Friedlander (Israel), Thorsten Fritzlar (Germany), Emiliya Velikova (Bulgaria)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: H: orange, Educational Building, room 205
Session Chairs: Dace Kuma, Demetra Pitta-Pantazi

Presentations: Gulden Karakok* (1), Houssein El Turkey (2), Milos Savic (3), Gail Tang (4), Emilie Naccarato (1), David Plaxco (3)
(1: University of Northern Colorado; 2: University of New Haven; 3: University of Oklahoma; 4: University of La Verne)
CREATIVITY-IN-PROGRESS RUBRIC ON PROVING – ENHANCING STUDENTS CREATIVITY
Julia Joklitschke* (1), Benjamin Rott (1), Maike Schindler (2)
(1: University of Duisburg-Essen; 2: Örebro University)
REVISITING THE IDENTIFICATION OF MATHEMATICAL CREATIVITY: VALIDITY CONCERNS REGARDING THE CORRECTNESS OF SOLUTIONS

Demetra Pitta-Pantazi*, Paraskevi Sophocleous
(University of Cyprus)
HIGHER ORDER THINKING IN MATHEMATICS: A THEORETICAL FORMULATION AND ITS EMPIRICAL VALIDATION

Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: H: orange, Educational Building, room 205
Session Chair: Alex Friedlander

Presentations: Alex Friedlander*
(Weizmann Institute of Science)
SOME TYPES OF CREATIVITY-PROMOTING TASKS

Jyoti Sharma*
(University of Delhi)
EFFECT OF MATHEMATICS LEARNING ON THE DEVELOPMENT OF MATHEMATICS CREATIVITY

Ingrid Semanišinová* (1), Martina Jesenská (2)
(1: Faculty of Science; 2: Giles Academy)
DEVELOPING FLEXIBILITY OF PROBLEM SOLVING STRATEGIES IN THE CLASSROOM

Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: H: orange, Educational Building, room 205
Session Chair: Torsten Fritzlar

Presentations: Lillie R. Albert*
(Boston College)
THE NEXT GENERATION OF ELEMENTARY MATHEMATICS TEACHERS: THE ROLE OF PERSONALITY AND CREATIVITY

Jarmila Novotná* (2), Hana Moraová (1)
(1: Charles University in Prague; 2: Charles University in Prague)
ORNAMENTS AND TESSALATIONS – ENCOURAGING CREATIVITY IN MATHEMATICS CLASSROOM

Daniela Assmus, Torsten Fritzlar* 
(University of Halle-Wittenberg)
MATHEMATICAL CREATIVITY IN PRIMARY GRADES

Nour Al-Sharif*, Sahar Khanafer, Amine El-Sahili
(Lebanese University)
MATHEMATICAL CREATIVITY: THE UNEXPECTED LINKS
**Fourth Session: Saturday, 30 July 2016, 12.00–13.30**
**Location: H: orange, Educational Building, room 205**
Session Chair: Emiliya Velikova

Presentations: Romualdas Kašuba*
(Vilnius University Lithuania)

**REMARKS ON CREATIVE POSING OF PROBLEMS – PRO ET CONTRA**

Paraskevi Sophocleous*
(University of Cyprus)

**MATHEMATICAL PROBLEM-POSING ABILITY AND CRITICAL THINKING IN MATHEMATICS**

Wajeeh Daher* (1,2), Ahlam Anabousy (1,3)
(1: Al-Qasemi Academic College of Education; 2: An-Najah National University; 3: Tel-Aviv University)

**FLEXIBILITY OF PRE-SERVICES TEACHERS IN PROBLEM POSING IN DIFFERENT ENVIRONMENTS**

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**TSG 30 – Mathematical competitions**

Co-chairs: Maria Falk de Losada (Colombia), Alexander Soifer (USA)
Team members: Christian Reiher (Germany), Jaroslav Svrcek (Czech Republic), Peter Taylor (Australia)

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**First Session: Tuesday, 26 July 2016, 12.00–13.30**
**Location: H: orange, Educational Building, room 424**
Session Chair: Mary Falk de Losada, Alexander Soifer

Presentations: Alexander Soifer*
(University of Colorado at Colorado Springs)

**BEYOND LAOZ : THE GOALS OF MATHEMATICS INSTRUCTION**

Iliana Ivanova Tsvetkova*
(Sofia High School of Mathematics)

**MATHEMATICS COMPETITIONS AS A TOOL FOR DEVELOPMENT OF GIFTED STUDENTS**

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**Second Session: Wednesday, 27 July 2016, 12.00 –13.30**
**Location: H: orange, Educational Building, room 424**
Session Chairs: Mary Falk de Losada, Alexander Soifer

Presentations: Mary Falk de Losada*
(Universidad Antonio Narino)

**ARE MATHEMATICS COMPETITIONS CHANGING MATHEMATICS?**

Donglin Ms. Chen*, Frederick K.S. Leung
(Faculty of Education)

**CHINA MATHEMATICAL OLYMPIAD SCHOOL: A CASE STUDY**
Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: H: orange, Educational Building, room 424
Session Chairs: Mary Falk de Losada, Alexander Soifer

Presentations: Peter Taylor* (University of Canberra)
SOME REFLECTIONS, SOME SUGGESTIONS

Luis F. Caceres Duque* (1), Jose H. Nieto Said (2), Rafael Sanchez Lamoned (3)
(1: University of Puerto Rico at Mayaguez; 2: Universidad del Zulia; 3: Universidad Antonio Narino)
THE MATHEMATICAL OLYMPIAD OF CENTRAL AMERICA AND THE CARIBBEAN:
17 YEARS SUPPORTING MATH CONTESTS IN THE REGION

Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30
Location: H: orange, Educational Building, room 424
Session Chairs: Mary Falk de Losada, Alexander Soifer

Presentations: Kiril Bankov* (University of Sofia)
NUMBERS ON A CIRCLE

Borislav Yordanov Lazarov*, Albena Vassileva
(Institute of Mathematics and Informatics)
AGE FACTOR IN PERFORMANCE ON A COMPETITION PAPER

TSG 31 – Language and communication in mathematics education

Co-chairs: Judit Moschkovich (USA), David Wagner (Canada)
Team members: Arindam Bose (South Africa), Jackeline Rodrigues Mendes (Brazil),
Marcus Schütte (Germany)

First Session: Tuesday, 26 July 2016, 12.00 – 13.30
Location: I: blue, Philosophical Tower, lecture hall G
Session Chair: David Wagner

Presentations: David Pimm* (Simon Fraser University)
FIFTY YEARS OF LANGUAGE DATA IN MATHEMATICS EDUCATION: A BRIEF HISTORY

Marcus Schuette* (TU Dresden)
SUBJECT-RELATED ACADEMIC LANGUAGE VERSUS MATHEMATICAL DISCOURSE

Judit Moschkovich* (University of California)
RECOMMENDATIONS FOR RESEARCH ON LANGUAGE AND LEARNING MATHEMATICS
Second Session: Wednesday, 27 July 2016, 12.00 – 13.30  
Location: I: blue, Philosophical Tower, lecture hall G  
Session Chair: Judit Moschkovich

Presentations: Arindam Bose* (1), K. Subramaniam (2), Mamokgethi Phakeng (3)  
(1: University of South Africa; 2: Homi Bhabha Centre for Science Education; 3: University of Cape Town)  
IDENTITY FOSTERED LANGUAGE COMMUNICATION IN A MATHEMATICS CLASSROOM: AN ANALYSIS

Kaouthar Boukafri* (1), Marta Civil (2), Núria Planas (1)  
(1: Universitat Autonoma de Barcelona; 2: University of Arizona)  
A TEACHER’S USE OF REVOICING IN MATHEMATICAL DISCUSSIONS

Judith Jung*, Marcus Schuette  
(TU Dresden)  
THE SIGNIFICANCE OF LINGUISTIC NEGOTIATION IN INCLUSIVE LEARNING OF MATHEMATICS IN PRIMARY SCHOOL

Third Session: Friday, 29 July 2016, 12.00 – 13.30  
Location: I: blue, Philosophical Tower, lecture hall G  
Session Chair: Jackeline Rodrigues Mendes

Presentations: Kirstin Erath*  
(TU Dortmund University)  
HOW CAN TEACHERS PROVIDE LEARNING OPPORTUNITIES FOR ORAL EXPLANATIONS?

Jinwoo Cho* (1), Eunjung Lee (2), Minsun Park (1), Kyeong-Hwa Lee (1)  
(1: Seoul National University; 2: Korea Foundation for the Advancement of Science & Creativity)  
FROM A QUESTION TO QUESTIONING WITHIN THE CONTEXT

David Wagner*, Annica Andersson  
(University of New Brunswick)  
4-YEAR-OLD LANGUAGE REPERTOIRE IN A COUNTING SITUATION

Jenni Ingram*, Nick Andrews, Andrea Pitt  
(University of Oxford)  
MAKING STUDENT EXPLANATIONS RELEVANT IN WHOLE CLASS DISCUSSION

Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30  
Location: I: blue, Philosophical Tower, lecture hall G  
Session Chair: Arindam Bose

Presentations: Benadette Aineamani*  
(Pearson Holdings South Africa)  
HOW LEARNERS COMMUNICATE THEIR MATHEMATICS REASONING IN A MATHEMATICS DISCOURSE.

Konstantinos Tatsis* (1), David Wagner (2)  
(1: University of Ioannina; 2: University of New Brunswick)  
AUTHORITY AND POLITENESS: JUXTAPOSED ANALYSES OF MATHEMATICS TEACHING EPISODES
Raquel Milani*
(Federal University of Rio Grande)
“IN SORRY. I DID NOT UNDERSTAND YOU”:
THE LEARNING OF DIALOGUE BY PROSPECTIVE TEACHERS

TSG 32 – Mathematics education in a multilingual and multicultural environment

Co-chairs: Richard Barwell (Canada), Anjum Halai (Pakistan)
Team members: Guida de Abreu (UK), Aldo Parra (Colombia), Lena Wessel (Germany)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: D: yellow, West Wing Building, room 220
Session Chairs: Richard Barwell, Anjum Halai

Presentations: Cris Edmonds-Wathen*
(Umeå University)
DESCRIPTIVE AND TYPOLOGICAL LINGUISTIC METHODOLOGIES IN MATHEMATICS EDUCATION RESEARCH

Jose Gregorio Solorzano Movilla*
(Corporación Universitaria Americana)
FROM THE GRAMATICAL ASPECTS OF THE ETTE TAARA TO THE ETTE ENNAKA’S MATHEMATICS

Lisa Anne Kasmer*, Anthony Snyder, Esther Billings
(Grand Valley State University)
TEXTBOOK LANGUAGE ACCESSIBLY IN ENGLISH MEDIUM CLASSES

Second Session: Wednesday, 27 July 2016, 12.00–13.30
Location: D: yellow, West Wing Building, room 220
Session Chairs: Richard Barwell, Anjum Halai

Presentations: Thulisile Nkambule*
(University of South Africa)
THE SIGNIFICANCE OF SOCIAL IDENTITY:
A CASE OF MATHEMATICS CLASSROOM WITH IMMIGRANTS IN SOUTH AFRICA

Lucia Sonja van Putten*, Hanlie Botha, Batseba Mofolo-Mbokane, Jeanine Mwambakana, Gerrit Stols
(University of Pretoria)
THE CULTURALLY RICH MATHEMATICS CLASS

Vanessa Tomaz*, Manuela David
(Universidade Federal De Minas Gerais)
HOW THE CHOICE OF ARTIFACTS MAY ENHANCE COMMUNICATION BETWEEN DIFFERENT COMMUNITIES
Third Session: Friday, 29 July 2016, 12.00–13.30
Location: D: yellow, West Wing Building, room 220
Session Chairs: Richard Barwell, Anjum Halai

Presentations: Aldo Parra* (Aalborg University)
EPISTEMIC DIMENSION OF MULTILINGUALISM: THE BRIGHT SIDE OF BABEL

Richard Barwell* (University of Ottawa)
MULTIPLE LANGUAGE RESOURCES IN AN ELEMENTARY SCHOOL MATHEMATICS CLASS FOR LEARNERS OF FRENCH IN QUEBEC

William C. Zahner* (San Diego State University)
BEYOND THE “LANGUAGE OF INSTRUCTION”: USING FORMAL AND INFORMAL DISCOURSE PRACTICES IN LINGUISTICALLY DIVERSE CLASSROOMS

Fourth Session: Saturday, 30 July 2016, 12.00–13.30
Location: D: yellow, West Wing Building, room 220
Session Chairs: Richard Barwell, Anjum Halai

IS GRADE 7 TOO LATE TO START WITH BILINGUAL MATHEMATICS COURSES? AN INTERVENTION STUDY

Marie Therese Farrugia* (University of Malta)
TRANSLANGUAGING BETWEEN MALTESE AND ENGLISH: THE CASE OF VALUE, COST AND CHANGE IN A GRADE 3 CLASSROOM

TSG 33 – Equity in mathematics education (including gender)

Co-chairs: Bill Atweh (Philippines), Joanne Rossi Becker (USA)
Team members: Barbro Grevholm (Norway), Gelsa Knijnik (Brazil), Laura Martignon (Germany), Jayasree Subramanian (India)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: H: orange, Educational Building, room 212
Session Chairs: Bill Atweh, Joanne Rossi Becker

Presentations: Danny Martin*, Victoria Trinder (University of Illinois at Chicago)
FROM CRITICAL TO RADICAL AGENDAS IN MATHEMATICS EDUCATION

Margaret Walshaw* (Massey University)
RECENT DEVELOPMENTS ON GENDER AND MATHEMATICS EDUCATION
Second Session: Wednesday, 27 July 2016, 12.00 – 13.30  
Location: H: orange, Educational Building, room 212  
Session Chair: Joanne Rossi Becker  

Presentations: Renato Marcone*  
(Federal University of Sao Paulo)  
“I DON’T WANNA TEACH THIS KIND OF STUDENTS”: SILENCE IN MATHEMATICS EDUCATION AND DEFICIENCIALISM ”  

Gelsa Knijnik* (1), Fernanda Wanderer (2)  
(1: UNISINOS; 2: UFRGS)  
MATHEMATICS EDUCATION, CULTURAL DIFFERENCES AND SOCIAL INEQUALITIES IN RURAL BRAZILIAN SCHOOLS  

Barbro Grevholm* (1), Ragnhild Johanne Rensaa (2)  
(1: University of Agder; 2: Narvik University College)  
INTERVENTIONS FOR EQUALITY – THEIR CREATION, LIFE AND DEATH. WHAT CAN WE LEARN FROM THEM?  

Mellony Holm Graven* (1), Nicky Roberts (2)  
(1: Rhodes University; 2: University of Johannesburg)  
FOCUSING ATTENTION ON PROMOTING LEARNER AGENCY FOR INCREASED QUALITY AND EQUITY IN MATHEMATICS LEARNING  

Third Session: Friday, 29 July 2016, 12.00 – 13.30  
Location: H: orange, Educational Building, room 212  

Group A – Session Chair: Bill Atweh  

Presentations: Arindam Bose (1), Renato Marcone* (2), Varun Kumar (3)  
(1: University of South Africa; 2: Federal University of Sao Paulo; 3: Tata Institute of Social Sciences)  
NON-TYPICAL LEARNING SITES: A PLATFORM WHERE FOREGROUND INTERPLAYS WITH BACKGROUND  

Anita Movik Simensen*, Anne Berit Fuglestad, Pauline Vos  
(University of Agder)  
LOWER ACHIEVING STUDENTS’ CONTRIBUTIONS IN SMALL GROUPS – WHAT IF A STUDENT SPEAKS WITH TWO VOICES  

Maria Alva Aberin*, Ma. Theresa Fernando, Flordeliza Francisco, Angela Fatima Guzon, Catherine Vistro-Yu  
(Ateneo de Manila University)  
PERCEIVED GAINS IN STUDENTS’ ABILITIES AND ATTITUDES TOWARDS MATHEMATICS FROM AN AFTER-SCHOOL MATHEMATICS PROGRAM  

Grant Adam Fraser*  
(California State University)  
AN INTERVENTION PROGRAM TO IMPROVE THE SUCCESS RATE OF DISADVANTAGED MINORITY STUDENTS IN PRE-CALCULUS COURSES
**Location: E: mint, Economical Building, room 1083**

**Group B – Session Chair: Barbro Grevholm**

Presentations: Jennifer Hall*
(Monash University)

GENDER, MATHEMATICS, AND MATHEMATICIANS: ELEMENTARY STUDENTS’ VIEWS AND EXPERIENCES

Jayasree Subramanian*
(Tata Institute of Social Sciences)

GENDER OF THE SCHOOL MATHEMATICS CURRICULUM

Eva Norén*, Lisa Björklund Boistrup
(Stockholm University)

GENDER STEREOTYPES IN MATHEMATICS TEXTBOOKS

Anina Mischau* (1, 2), Katja Eilerts (2)
(1: Freie Universität Berlin; 2: Humboldt-Universität zu Berlin)

WITHOUT GENDER COMPETENT MATH TEACHERS NO GENDER EQUITY IN MATH EDUCATION AT SCHOOL

**Fourth Session: Saturday, 30 July 2016, 12.00–13.30**

**Location: H: orange, Educational Building, room 212**

Session Chair: Jayasree Subramanian

Presentations: Bill Atweh (1), Dalene Swanson* (2)
(1: Philippines Normal University; 2: University of Stirling)

ALTERNATIVE UNDERSTANDINGS OF EQUITY AND THEIR RELATIONSHIP TO ETHICS

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**TSG 34 – Social and political dimensions of mathematics education**

Co-chairs: Murad Jurdak (Lebanon), Renuka Vithal (South Africa)
Team members: Peter Gates (UK), Elizabeth de Freitas (USA), David Kollosche (Germany)

**First Session: Tuesday, 26 July 2016, 12.00–13.30**

**Location: D: yellow, West Wing Building, room 222**

Session Chair: Renuka Vithal, Murad Jurdak

PANELISTS: PAOLA VALERO, LISA DARRAGH, RENUKA VITHAL, MURAD JURDAK

**Second Session: Wednesday, 27 July 2016, 12.00–13.30**

**Location: D: yellow, West Wing Building, room 222**

**Group A – Session Chair: Renuka Vithal**

Presentations: Paula Patricia Guerra Lombardi* (1), Woong Lim (2), Hyunjung Kang (3)
(1: Kennesaw State University; 2: University of New Mexico; 3: University of Northern Colorado)

TEACHING MATHEMATICS FOR SOCIAL JUSTICE HERE AND THERE: TEACHER CANDIDATES’ REACTIONS IN THE UNITED STATES AND URUGUAY
Peter Appelbaum* (Arcadia University)
NOMADIC TOPOLOGIES CHANGE MATHEMATICS EDUCATORS’ SUBJECTIVITIES AND HENCE THEIR WORLDS

Celso Ribeiro Campos*, Aurelio Hess (Pontifícia Universidade Católica de São Paulo)
FINANCIAL EDUCATION AND MATHEMATICS EDUCATION: A CRITICAL APPROACH

Hilary Povey, Gill Adams*, Rosie Everley (Sheffield Hallam University)
“IT’S INFLUENCE TAINTS ALL”: MATHEMATICS TEACHERS RESISTING PERFORMATIVITY THROUGH ENGAGEMENT WITH THE PAST

Location: D: yellow, West Wing Building, room 223
Group B – Session Chair: David Kollosche

Presentations: Alexandre Pais* (Manchester Metropolitan University)
TRUTHS AND POWERS IN MATHEMATICS EDUCATION

Hauke Straehler-Pohl* (Freie Universität Berlin)
The Ethics of Mathematical Application and the Ideology of Solutionism

Alex Rodrigo Montecino Muñoz* (Aalborg University)
Outcome of the Market Logic: The Academic-Professional Development of the Mathematics Teacher

Laura Black*, Sophina Choudry, Kelly Pickard-Smith, Bethany Ryan, Julian Williams (University of Manchester)
Enacting Hybridity in a Home-School Mathematics Activity

Sabrina Bobsin Salazar* (University of Michigan)
Mathematics, the Axiomatization Movement, and its Social Implications

Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: D: yellow, West Wing Building, room 222
Group A – Session Chair: Murad Jurdak

Presentations: Tamsin Meaney* (Bergen University College)
Mathematics Curricula: Issues of Access and Quality

Natalia Ruiz López* (1), Gustavo Bruno (1), César Sáenz de Castro (1), José Bosch Betancor (2) (1: Autonomous University of Madrid; 2: IES José Hierro)
Mathematics Education for Social Justice: A Case Study
Lisa Jean Darragh*  
(Universidad de Chile)  
SOCIAL, POLITICAL, PERSONAL, AND IMAGINED CONSTRAINTS ON ENACTING CHANGE AFTER PROFESSIONAL DEVELOPMENT

Troels Lange*, Tamsin Meaney  
(Bergen University College)  
THE PRODUCTION OF “COMMON SENSE” IN THE MEDIA ABOUT MORE MATHEMATICS IN EARLY CHILDHOOD EDUCATION

Belgüzar Kara*  
(University of Duisburg-Essen)  
THE INFLUENCE OF HABITUAL DISPOSITIONS ACCORDING TO PIERRE BOURDIEU IN HANDLING MATHEMATICAL PROBLEMS

Location: D: yellow, West Wing Building, room 223  
Group B – Session Chair: Elizabeth de Freitas

Presentations: Yvette Solomon*  
(Manchester Metropolitan University)  
PARODY AND POWER: PRODUCING AND RESISTING MATHEMATICS ‘ABILITY”

Anna Chronaki*  
(University of Thessaly)  
MATHS MOVES ME: THE BODY AS A POLITICAL SPACE FOR LEARNING

Nina Bohlmann*  
(Freie Universität Berlin)  
UNEQUAL BODIES – CORPOREALITY AND SOCIAL INEQUALITY IN THE CONTEXT OF MATHEMATICS EDUCATION

Elizabeth de Freitas* (1), Nathalie Sinclair (2)  
(1: Manchester Metropolitan University; 2: Simon Fraser University)  
THE BIOPOLITICS OF NUMBER SENSE: ORDINALITY AND ONTOLOGY

Fourth Session: Saturday, 30 July 2016, 12.00–13.30  
Location: D: yellow, West Wing Building, room 222  
Session Chairs: David Kollosche, Elizabeth de Freitas

Presentations: David Kollosche (1), Elizabeth de Freitas (2)  
(1: Universität Potsdam, 2: Manchester Metropolitan University)  
ECONOMIC DIMENSIONS OF MATHEMATICS EDUCATION

Renuka Vithal*  
(University of KwaZulu-Natal)  
REPORTING BACK FROM PARALLEL SESSIONS

Murad Jurdak*  
(American University of Beirut)  
THE IMPLICATIONS OF SOCIAL AND POLITICAL DIMENSIONS OF MATHEMATICS EDUCATION
**TSG 35 – Role of ethnomathematics in mathematics education**

Co-chairs: Milton Rosa (Brazil), Lawrence Shirley (USA)
Team members: Willy V. Alangui (Philippines), Maria Elena Gavarrete (Costa Rica)

**First Session: Tuesday, 26 July 2016, 12.00 – 13.30**
**Location: H: orange, Educational Building, room 20**
Session Chair: Lawrence Shirley

Presentations: Ubiratan D’Ambrosio (1), Milton Rosa* (2)
(1: Universidade Anhanguera; 2: Universidade Federal de Ouro Preto)
ETHNOMATHEMATICS AND ITS PEDAGOGICAL ACTION

**Second Session: Wednesday, 27 July 2016, 12.00 – 13.30**
**Location: H: orange, Educational Building, room 20**
Group A – Session Chair: Milton Rosa

Presentations: Marcos Cherinda*
(Univeridade Pedagoga)
FROM DEFROSTING HIDDEN MATHEMATICAL KNOWLEDGE TO ITS FORMAL LEARNING – REVIEWING GERDES’ RESEARCH APPROACH

Wilfredo Alangui*
(University of the Philippines Baguio)
“THERE’S A THEORY BEHIND WHAT WE’RE DOING!”
ETHNOMATHEMATICS AND INDIGENOUS PEOPLES’ EDUCATION IN THE PHILIPPINES

Morane Almeida Oliveira*
(Instituto Federal de Educação Ciência e Tecnologia do Acre – IFAC)
PROPOSAL FOR A METHODOLOGICAL APPROACH FOR THE TECHNICAL COURSE FOR INDIGENOUS AGROFORESTRY AGENTS IN THE STATE OF ACRE

**Location: H: orange, Educational Building, room 21**
Group B – Session Chair: Maria Elena Gavarrete

Presentations: Tony Trinick* (1), Uenuku Fairhall (2), Tamsin Meaney (3)
(1: The University of Auckland; 2: Te Kura o Te Koutu; 3: Bergan University)
CULTURAL AND MATHEMATICAL SYMMETRY IN MAORI MEETING HOUSES

Veronica Albanese* (1), Natividad Adamuz-Povedano (2), Rafael Bracho-López (2)
(1: University of Granada; 2: University of Córdoba)
ETHNOMATHEMATICS: TWO THEORETICAL VIEWS AND TWO APPROACHES TO EDUCATION

Charoula Stathopoulou*
(UNIVERSITY OF THESALY)
ONCE UPON A TIME ... THE GYPSY BOY TURNED 15 WHILE STILL IN THE FIRST GRADE
Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: H: orange, Educational Building, room 20
Group A – Session Chair: Lawrence Shirley

Presentations: Daniel Clark Orey* (UFOP)
THE CRITICAL-REFLECTIVE DIMENSION OF ETHNOMODELING

Location: H: orange, Educational Building, room 21
Group B – Session Chair: Maria Elena Gavarrete

Presentations: Miriam Amit*, Fouse Abu-Qouder (Ben Gurion University)
WEAVING CULTURE AND MATHEMATICS IN THE CLASSROOM –
THE CASE OF BEDOUIN ETHNOMATHEMATICS

Karen François* (Vrije Universiteit Brussel – Free University Brussels)
WITTGENSTEIN’S LATE PHILOSOPHY AS A PHILOSOPHICAL FOUNDATION
FOR ETHNOMATHEMATICS

Mogege Mosimege* (Human Sciences Research Council)
THE ROLE OF LANGUAGE IN ETHNOMATHEMATICAL RESEARCH AND IMPLICATIONS
FOR MATHEMATICS TEACHING AND LEARNING

Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30
Location: H: orange, Educational Building, room 20
Group A – Session Chair: Daniel Clark Orey

Presentations: Jaya Bishnu Pradhan* (Tribhuvan University)
CHUNDARAS’ CULTURE AND MATHEMATICAL IDEAS

Maria Cecilia Fantinato* (1), José Ricardo e Souza Mafra (2)
(1: Universidade Federal Fluminense (UFF); 2: Universidade Federal do Oeste do Pará (UFOPA))
ARITAPERA’S CRAFTSWOMEN: INFORMAL LEARNING PROCESSES IN AN ETHNOGRAPHIC
STUDY IN ETHNOMATHEMATICS

Location: H: orange, Educational Building, room 21
Group B – Session Chair: Wilfredo Alangui

Presentations: Bo Yu* (southwest university)
CURRICULUM REFORM AND ETHIC CULTURE IN ETHIC REGION

Tod Shockey* (1), John Bear Mitchell (2)
(1: University of Toledo; 2: University of Maine)
AN ETHNOMODEL OF A PENOBSCOT LODGE
TSG 36 – Task design, analysis and learning environments

Co-chairs: Jiansheng Bao (China), Jere Confrey (USA)
Team members: Jonei Barbosa (Brazil), Helmut Linneweber-Lammerskitten (Switzerland), Anne Watson (UK)

First Session: Tuesday, 26 July 2016, 12.00 – 13.30
Location: H: orange, Educational Building, room 05
Session Chair: Jere Confrey

Presentations: Anne Watson*
(University of Oxford)
PARAMETERS FOR PRACTICE AND RESEARCH IN TASK DESIGN IN MATHEMATICS EDUCATION

Koeno Gravemeijer*
(Eindhoven University of Technology)
A PERSONAL TAKE ON INSTRUCTIONAL DESIGN

Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: H: orange, Educational Building, room 05
Session Chair: Anne Watson

Presentations: Kazuhiko Nunokawa*
(Joetsu University of Education)
BRIDGING STUDENTS’ IDEAS AND LESSONS’ GOALS

Angelika Kullberg*
(University of Gothenburg)
VARIATION WITHIN SETS OF EXAMPLES

Berta Barquero* (1), Ioannis Papadopoulos (2), Mario Barajas (3), Chronis Kynigos (4)
(1: University of Barcelona; 2: Aristotle University of Thessaloniki and CTI & Press Diophantus; 3: University of Barcelona; 4: University of Athens and CTI & Press Diophantus)
CROSS-CASE DESIGN IN USING DIGITAL TECHNOLOGIES: TWO COMMUNITIES OF INTEREST DESIGNING A C-BOOK UNIT
Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: H: orange, Educational Building, room 05
Group A – Session Chair: Helmut Linneweber-Lammerskitten

Presentations: Alexandra Thiel-Schneider*
(TU Dortmund)
HOW DOES THE CONNECTION OF DIFFERENT PERSPECTIVES ON EXPONENTIAL GROWTH SUCCEED?

Corey Brady (1), Cheryl Eames (2), Hyunyi Jung* (3)
(1: Vanderbilt University; 2: Southern Illinois University Edwardsville; 3: Calvin College)
DESIGN PRINCIPLES FOR CURRICULAR SEQUENCES FOCUSED ON MODELS AND MODELING

Natascha Albersmann*
(Ruhr-Universität Bochum)
CONSTRUCTION OF MATHEMATICAL TASKS FOR PARENTS AND THEIR CHILDREN ON SECONDARY SCHOOL LEVEL

Jing Cheng* (1), Shuhua An (2), Jiansheng Bao (1)
(1: East China Normal University; 2: California State University Long Beach)
COGNITIVE DEMAND OF MATHEMATICS OPENING PROBLEMS EXHIBITED BY EXPERT SECONDARY MATHEMATICS TEACHERS IN SHANGHAI-CHINA

Location: H: orange, Educational Building, room 06
Group B – Session Chair: Anne Watson

Presentations: Jean Marie Kraemer (1), Joana Maria Brocardo* (2), Fatima Mendes (2), Delgado Catarina (2)
(1: CITO; 2: ESE Instituto Politécnico de Setúbal)
DESIGNING TASKS FOR ADAPTIVE/Flexible MULTIPLICATIVE REASONING

Lilian Edelmira Isidro Camac*, Candy Clara Ordoñez Montañez, Gina Patricia Paz Huaman
(Sistema Nacional de Evaluacion Acreditacion y Certificacion de la Calidad de la Educacion Basica)
AUTHENTIC TASKS TO ASSESS MATH COMPETENCE IN LEARNING PROGRESS MAPS

Dong-Won Kim* (1), JinHyeong Park (2)
(1: Cheongju National University of Education; 2: Myongji University)
BUILDING MATHEMATICAL STATEMENTS THROUGH EXEMPLIFYING

Gisela Montiel*, Luis López-Acosta, Ricardo Cantoral, Olivia Scholz
(Centro de Investigación y de Estudios Avanzados del IPN)
DESIGN-BASED SOCIOEPISTEMOLOGICAL RESEARCH

Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30
Location: H: orange, Educational Building, room 05
Session Chair: Jere Confrey

Presentations: Richard Noss, Celia Hoyles*
(UCL Institute of Education)
MATHEMATICS AND DIGITAL TECHNOLOGY: CHALLENGES AND EXAMPLES FROM DESIGN RESEARCH
TSG 37 – Mathematics curriculum development

Co-chairs: Anita Rampal (India), Zalman Usiskin (USA)
Team members: Andreas Büchter (Germany), Iman Osta (Lebanon), Jeremy Hodgen (UK)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: H: orange, Educational Building, room 106
Session Chair: Anita Rampal

Presentations: Zalman Usiskin*
(University of Chicago)
PARADIGMS OF CURRICULUM DEVELOPMENT IN SCHOOL MATHEMATICS –
A PERSONAL VIEW

Mark Prendergast* (1), Cormac Breen (2), Michael Carr (2), Fiona Faulkner (2)
(1: Trinity College Dublin; 2: Dublin Institute of Technology)
INVESTIGATING THIRD LEVEL LECTURERS’ AWARENESS OF SECOND LEVEL
CURRICULUM REFORM

Maria-Teresa Rojano-Ceballos* (1), Armando Solares-Rojas (2)
(1: Centro de Investigación y de Estudios Avanzados; 2: Universidad Pedagógica Nacional)
THE MATHEMATICS CURRICULUM DESIGN FROM AN INTERNATIONAL PERSPECTIVE.
METHODOLOGICAL ELEMENTS FOR A COMPARATIVE ANALYSIS

Second Session: Wednesday, 27 July 2016, 12.00–13.30
Location: H: orange, Educational Building, room 106
Session Chair: Zalman Usiskin

Presentations: Anita Rampal*
(Delhi University)
WHAT MATH FOR ALL? FOR AND FROM LIFE?

Jerry Lipka*
(university of alaska Fairbanks)
THE “CENTER OF EVERYTHING”: INSIDERS AND OUTSIDERS WORKING TOGETHER
DEVELOPING MATHEMATICS CURricula

Third Session: Friday, 29 July 2016, 12.00–13.30
Location: H: orange, Educational Building, room 106
Session Chair: Andreas Büchter

Presentations: Vivien M. Townsend*
(Manchester Metropolitan University)
THE ‘MASTERY’ CURRICULUM IN ENGLAND: A BATTLE WITH DOMINANT
DISCOURSES OF ABILITY AND ACCOUNTABILITY

Christian R. Hirsch*
(Western Michigan University)
PRINT AND DIGITAL CURRICULUM DESIGN IN THE U.S.: THE CASE OF TRANSITION TO COLLEGE MATHEMATICS AND STATISTICS
Victor Egidius Schmidt*, Jos Tolboom
(SLO)
DESIGN AND DEVELOPMENT OF A TREND ANALYSIS METHOD FOR A MATHEMATICS CURRICULUM

Fourth Session: Saturday, 30 July 2016, 12.00–13.30
Location: H: orange, Educational Building, room 106
Session Chairs: Anita Rampal, Zalman Usiskin

Presentations: Guorui Yan*, K.S. Frederick Leung
(The University of Hong Kong)
A COMPARATIVE CASE STUDY ON TEACHERS’ USE OF MATHEMATICS TEXTBOOKS IN BEIJING AND HONG KONG

Dawn Teuscher* (1), Lisa Kasmer (2), Travis Olson (3), Shannon Dingman (4)
(1: Brigham Young University; 2: Grand Valley State University; 3: University of Nevada-Las Vegas; 4: University of Arkansas)
ISOMETRIES IN NEW U.S. MIDDLE GRADES TEXTBOOKS: HOW ARE ISOMETRIES AND CONGRUENCE RELATED?

TSG 38 – Research on resources (textbooks, learning materials etc.)

Co-chairs: Lianghuo Fan (UK), Luc Trouche (France)
Team members: Chunxia Qi (China), Sebastian Rezat (Germany), Jana Visnovska (Australia)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: I: blue, Philosophical Tower, lecture hall D
Session Chair: Sebastian Rezat

Presentations: Janine Remillard*
(University of Pennsylvania)
UNDERSTANDING TEACHER-RESOURCE INTERACTIONS: PERCEIVING CURRICULUM RESOURCES

Moneoang Jeanette Leshota*, Jill Adler
(National University of Lesotho)
DISAGGREGATING A MATHEMATICS TEACHER’S PEDAGOGICAL DESIGN CAPACITY (PDC)

Lianghuo Fan* (1), Mailizar Mailizar (2), Manahel Alafaleq (1), Yi Wang (1)
(1: University of Southampton; 2: University of Southampton; Syiah Kuala University)
HOW PROOF IS PRESENTED IN SELECTED SECONDARY MATHS TEXTBOOKS IN CHINA, INDONESIA AND SAUDI ARABIA

Chunxia Qi* (1), Xinyan Zhang (2), Danting Huang (3)
(1: Beijing Normal University; 2: Tianjin Normal University; 3: Beijing NO. 80 Middle School)
RESEARCH ON TEXTBOOKS USED IN SECONDARY SCHOOL – FROM THE PERSPECTIVE OF TEACHERS’ ROLE
**Second Session: Wednesday, 27 July 2016, 12.00 – 13.30**

**Location:** I: blue, Philosophical Tower, lecture hall D

Session Chair: Jana Visnovska

Presentations: Luc Trouche* (1), Ghislaine Gueudet (2), Birgit Pepin (3)
(1: Ecole Normale Supérieure de Lyon; 2: UBO; 3: TU/e)

**OPEN EDUCATIONAL RESOURCES: A CHANCE FOR ENRICHING MATHEMATICS TEACHERS’ RESOURCE SYSTEMS?**

Chronis Kynigos*, Aggeliki Kolovou
(UoA & CTI)

TEACHERS AS DESIGNERS OF DIGITAL EDUCATIONAL RESOURCES FOR CREATIVE MATHEMATICAL THINKING

Shuping Pu* (1,2), Naiqing Song (2)
(1: Chongqing Normal University; 2: Southwest University)

**RESEARCH ON INTERNATIONAL DEVELOPMENT TRENDS OF PRIMARY MATHEMATICS TEXTBOOKS IN THE 21ST CENTURY**

Katiane de Moraes Rocha*
(Ecole Normale Superieure)

USES OF ONLINE RESOURCES AND DOCUMENTATIONAL TRAJECTORIES: THE CASE OF SÉSAMATH.

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**Third Session: Friday, 29 July 2016, 12.00 – 13.30**

**Location:** I: blue, Philosophical Tower, lecture hall D

Session Chair: Chunxia Qi

Presentations: Hendrik Van Steenbrugge*, Maria Larsson, Andreas Ryve, Eva Insulander, Daniel Brehmer
(Mälardalen University)

**CURRICULUM SUPPORT FOR TEACHERS: A COLLECTIVE PERSPECTIVE**

Axelle Person Faughn*, Nathan Borchelt
(Western Carolina University)

**MATHEMATICS TEACHERS’ CIRCLES: A RESOURCE PERSPECTIVE ON CLASSROOM TRANSFER**

Chongyang Wang*
(East China Normal University)

**ANALYSING TEACHERS’ EXPERTISE, RESOURCES AND COLLECTIVE WORK THROUGHOUT CHINESE AND FRENCH WINDOWS**

Nataly Essonnier* (1), Chronis Kynigos (2), Jana Trgalova (1), Maria Daskolia (2)
(1: University Claude Bernard Lyon 1; 2: CTI & Press “Diophantus”)

**STUDYING THE ROLE OF CONTEXT IN SOCIAL CREATIVITY FOR THE DESIGN OF DIGITAL RESOURCES**
Fourth Session: Saturday, 30 July 2016, 12.00–13.30
Location: I: blue, Philosophical Tower, lecture hall D
Session Chairs: Lianghuo Fan, Luc Trouche

Presentations: Kenneth Ruthven*
(University of Cambridge)
RESEARCHING INSTRUCTIONAL ACTIVITY AND STUDENT INTERACTION WITH
AND THROUGH DIGITAL RESOURCES

Jana Visnovska* (1), Jose Luis Cortina (2)
(1: The University of Queensland; 2: Universidad Pedagogica Nacional)
RESOURCES AS A MEANS OF SUPPORTING TEACHERS IN PLANNING FOR
INTERACTIONS WITH STUDENTS’ IDEAS

Elena Naftaliev*
(Achva Academic College)
ENGAGEMENTS OF PROSPECTIVE TEACHERS WITH E-TEXTBOOK

Ok-Kyeong Kim*
(Western Michigan University)
TEACHER DECISIONS ON LESSON SEQUENCE AND THEIR IMPACT ON OPPORTUNITIES
FOR STUDENTS TO LEARN

TSG 39 – Large scale assessment and testing in mathematics education

Co-chairs: Rae Young Kim (Korea), Christine Suurtamm (Canada)
Team members: Edward Silver (USA), Stefan Ufer (Germany), Pauline Vos (Norway)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: B: dark-brown, East Wing Building, room 122
Session Chairs: Rae Young Kim, Christine Suurtamm

Presentations: Christian Bokhove*
(University of Southampton)
OPPORTUNITY TO LEARN MATHS: A CURRICULUM APPROACH WITH TIMSS 2011 DATA

Emiliano Augusto Chagas* (1), Mauricio Urban Kleinke (2)
(1: Escola Superior de Engenharia e Gestão; 2: Universidade Estadual de Campinas)
LARGE-SCALE ASSESSMENT AS A WAY OF STUDYING NATIONAL ISSUES OF GENDER
AND SOCIOECONOMIC STATUS

Christina Drüke-Noe* (1), Svenja Mareike Kühn (2)
(1: Pädagogische Hochschule Weingarten; 2: Universität Duisburg-Essen)
CHARACTERISTICS OF MATHEMATICS TASKS SET IN EUROPEAN STATEWIDE EXIT EXAMS
Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: B: dark-brown, East Wing Building, room 122
Session Chairs: Christine Suurtamm, Rae Young Kim

Presentations: John Kwame Dogbey* (1), James Kwame Dogbey (2)
(1: University of Nebraska at Omaha; 2: Texas A&M University – Corpus Christi)
DEPTH OF KNOWLEDGE AND CONTEXT CHARACTERISTICS OF THE WEST AFRICAN EXAMINATION COUNCIL'S CORE MATHEMATICS ASSESSMENT

Nadine Grapin* (LDAR-UPEC)
VALIDITY OF LARGE SCALE MATHEMATICS ASSESSMENT: A DIDACTICAL ANALYSIS

Tibor Marcinek* (1), Edita Partová (2)
(1: Central Michigan University; 2: Comenius University)
EXPLORING CULTURAL ASPECTS OF KNOWLEDGE FOR TEACHING THROUGH ADAPTATION OF U.S.-DEVELOPED MEASURES: CASE OF SLOVAKIA

Dun Nkhoma Kasoka* (1), Arne Jakobsen (2), Mercy Kazima (1)
(1: University of Malawi; 2: University of Stavanger)
PSYCHOMETRIC PROPERTIES OF ADAPTED MATHEMATICAL KNOWLEDGE FOR TEACHING MEASURERS FOR USE IN MALAWI

Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: B: dark-brown, East Wing Building, room 221
Session Chairs: Karin Brodie, Christine Suurtamm

Presentations: Jonathan David Bostic* (1), Toni Sondergeld (2)
(1: Bowling Green State University; 2: Drexel University)
VALIDATING AND VERTICALLY EQUATING PROBLEM-SOLVING MEASURES

Francisco J. Ariza-Hernandez, Flor M. Rodriguez-Vásquez, Martin P. Arciga-Alejandre* (Universidad Autonoma de Guerrero)
ANALYSIS OF THE UNDERSTANDING OF A MATHEMATICAL CONCEPT USING A BAYESIAN IRT MODEL

Hugh Burkhardt* (Shell Centre)
HIGH-STAKES ASSESSMENT AS A TOOL FOR IMPROVEMENT

Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30
Location: B: dark-brown, East Wing Building, room 122
Session Chair: Rae Young Kim

Presentations: S. Kanageswari Suppiah Shanmugam* (Universiti Utara Malaysia)
STUDENTS’ ACHIEVEMENT IN TIMSS 2011 MATHEMATICS: A LOOK AT THE COGNITIVE DOMAINS
TSG 40 – Classroom assessment for mathematics learning

Co-chairs: Karin Brodie (South Africa), Denisse Thompson (USA)
Team members: Leonora Diaz Moreno (Chile), Natalie Sayac (France), Stanislaw Schukajlow (Germany)

First Session: Tuesday, 26 July 2016, 12.00 – 13.30
Location: B: dark-brown, East Wing Building, room 221
Session Chair: Denisse Thompson

Presentations: Malcolm Swan, Colin Foster*
(University of Nottingham)
FORMATIVE ASSESSMENT LESSONS FOR CONCEPT DEVELOPMENT AND PROBLEM SOLVING

Carolyn Jia Ling Sia*, Chap Sam Lim
(Universiti Sains Malaysia)
USING COGNITIVE DIAGNOSTIC ASSESSMENT (CDA) AS AN ALTERNATIVE MODES OF ASSESSMENT FOR LEARNING

Miriam Krieger* (1), Melanie Platz (2), Kathrin Winter (3), Engelbert Niehaus (2)
(1: University of Münster; 2: University of Koblenz-Landau; 3: University of Flensburg)
CLASSROOM ASSESSMENT AND LEARNING SUPPORT FOR LOGICAL REASONING IN MATHEMATICS EDUCATION

Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: B: dark-brown, East Wing Building, room 221
Session Chair: Karin Brodie

Presentations: Nathalie Sayac*
(Université Paris Est Créteil)
HOW ARE PUPILS IN FRENCH PRIMARY SCHOOL ASSESSED IN MATHEMATICS?
A DIDACTICAL APPROACH TO EXPLORE THIS QUESTION

Christine Pamela Hardie*
(Cognition Education)
MAKING OVERALL TEACHER JUDGMENTS IN MATHEMATICS
Richelle Marie Marynowski*  
(University of Lethbridge)  
SECONDARY MATHEMATICS TEACHER ASSESSMENT BELIEFS AND PRACTICES

Jimmy Pai*  
(University of Ottawa)  
IN-THE-MOMENT DECISIONS: AN INVESTIGATION ON OBSERVATIONS AND CONVERSATIONS AS ASSESSMENTS IN THE SECONDARY CLASSROOM

Third Session: Friday, 29 July 2016, 12.00 – 13.30  
Location: B: dark-brown, East Wing Building, room 221  
Session Chairs: Karin Brodie, Christine Suurtamm

Presentations: Jonathan David Bostic* (1), Toni Sondergeld (2)  
(1: Bowling Green State University; 2: Drexel University)  
VALIDATING AND VERTICALLY EQUATING PROBLEM-SOLVING MEASURES

Francisco J. Ariza-Hernandez, Flor M. Rodriguez-Vásquez, Martin P. Arciga-Alejandre*  
(Universidad Autonoma de Guerrero)  
ANALYSIS OF THE UNDERSTANDING OF A MATHEMATICAL CONCEPT USING A BAYESIAN IRT MODEL

Hugh Burkhardt*  
(Shell Centre)  
HIGH-STAKES ASSESSMENT AS A TOOL FOR IMPROVEMENT

Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30  
Location: B: dark-brown, East Wing Building, room 221  
Session Chair: Denisse Thompson

Presentations: Amanda Jane O’Shea*  
(University of Northampton)  
EXEMPLIFYING THE EXPERT PRIMARY MATHEMATICS CLASSROOM: THE CASE OF ALEX AND ASSESSMENT FOR LEARNING.

Michiel Veldhuis*, Marja Van den Heuvel-Panhuizen, Xiaoyan Zhao  
(Utrecht University)  
SUPPORTING PRIMARY SCHOOL TEACHERS’ ASSESSMENT PRACTICE IN MATHEMATICS: EFFECTS ON STUDENTS’ LEARNING

Rafi’ Safadi*  
(The Academic Arab College for Education in Israel)  
SELF-DIAGNOSIS AS A TOOL FOR SUPPORTING 5TH-GRADERS’ LEARNING ABOUT SIMPLE FRACTIONS

Waldemar Straumberger*  
(University of Bielefeld)  
USING SELF-ASSESSMENT FOR INDIVIDUAL PRACTICE IN MATH CLASSES
**TSG 41 – Uses of technology in primary mathematics education (up to age 10)**

Co-chairs: Sophie Soury-Lavergne (France), Colleen Vale (Australia)  
Team members: Francesca Ferrara (Italy), Kronthong Khairiree (Thailand), Silke Ladel (Germany)

**First Session: Tuesday, 26 July 2016, 12.00–13.30**  
**Location:** B: dark-brown, East Wing Building, room 222  
**Session Chairs:** Colleen Vale, Sophie Soury-Lavergne

Presentations: Kevin Larkin* (1), Todd Milford (2)  
(1: Griffith University; 2: University of Victoria)  
**ENHANCING STUDENT LEARNING USING GEOMETRY APPS: UTILISING THE HOMOGENEITY AND HETEROGENEITY OF CLUSTERS OF APPS**  

Annie Savard* (1), Kate Highfield (2)  
(1: McGill University; 2: Macquarie University)  
**ROBOTIC TASKS: AFFORDANCES FOR MATHEMATICS LEARNING?**  

Anne Voltolini*  
(École Normale Supérieure de Lyon)  
**DUO OF DIGITAL AND MATERIAL ARTIFACTS DEDICATED TO THE LEARNING OF GEOMETRIE AT PRIMARY SCHOOL**

**Second Session: Wednesday, 27 July 2016, 12.00 – 13.30**  
**Location:** B: dark-brown, East Wing Building, room 222  
**Session Chair:** Silke Ladel

Presentations: Patricia Moyer-Packenham*, Jessica Shumway, Emma Bullock, Katie Anderson-Pence, Stephen Tucker, Arla Westenskow, Jennifer Boyer-Thurgood, Hilal Gulkilik, Christina Watts, Kerry Jordan  
(Utah State University)  
**USING VIRTUAL MANIPULATIVES ON IPADS: HOW APP ALIGNMENT PROMOTES YOUNG CHILDREN’S MATHEMATICS LEARNING**  

Sophie Soury-Lavergne*  
(Institut Français de l’Education ENS de Lyon)  
**DUOS OF ARTEFACTS TO ENHANCE MATHEMATICAL LEARNING**  

Sean Chorney*  
(Simon Fraser University)  
**EXPLORING THE SOCIAL DIMENSION OF USING TOUCHCOUNTS**

**Third Session: Friday, 29 July 2016, 12.00 – 13.30**  
**Location:** B: dark-brown, East Wing Building, room 222  
**Session Chair:** Kronthong Khairiree

Presentations: Catherine Attard*  
(Western Sydney University)  
**IS CURRENT RESEARCH ASSISTING THE IMPLEMENTATION OF CONTEMPORARY ICT IN THE PRIMARY MATHEMATICS CLASSROOM?**
Nigel Stuart Calder*, Carol Murphy (University of Waikato)
RESHAPING THE LEARNING EXPERIENCE THROUGH APPS: AFFORDANCES

Shannon Larsen* (1), Kelly McCormick (2), Pam Buffington (3), Josephine Louie (3)
(1: University of Maine at Farmington; 2: University of Southern Maine; 3: Education Development Center)
USING 1-1 MOBILE TECHNOLOGY TO SUPPORT STUDENT DISCOURSE

Fourth Session: Saturday, 30 July 2016, 12.00–13.30
Location: B: dark-brown, East Wing Building, room 222
Session Chair: Francesca Ferrara

Presentations: Krongthong Khairiree* (International College)
ENHANCING STUDENTS’ VISUALIZE SKILLS IN SOLVING WORD PROBLEMS USING BAR MODEL AND THE GEOMETER’S SKETCHPAD

Stéphane Cyr*, Patrick Charland, Martin Riopel, Marie-Hélène Bruyère (UNIVERSITE DU QUÉBEC À MONTRÉAL)
IMPACT OF A VIDEO GAME ON FRACTIONS CONCEPT LEARNING IN ELEMENTARY SCHOOL STUDENTS

Tony Trinick, Piata Allen*, Bruce Taplin, Ana Pipi (The University of Auckland)
HE PUAWAITANGA HARAKEKE – USING TECHNOLOGY TO ACCELERATE LEARNING IN INDIGENOUS LANGUAGE SCHOOLS

TSG 42 – Uses of technology in lower secondary mathematics education (age 10 to 14)
Co-chairs: Lynda Ball (Australia), Paul Drijvers (Netherlands)
Team members: Bärbel Barzel (Germany), Yiming Cao (China), Michela Maschietto (Italy)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: D: yellow, West Wing Building, room 120
Session Chair: Lynda Ball

Presentations: Paul Drijvers* (Freudenthal Institute Utrecht University)
EVIDENCE FOR BENEFIT? REVIEWING EMPIRICAL RESEARCH ON THE USE OF DIGITAL TOOLS IN MATHEMATICS EDUCATION

M. Kathleen Heid* (The Pennsylvania State University)
QUALITATIVE RESEARCH ON THE USE OF DIGITAL TOOLS IN MATHEMATICS TEACHING AND LEARNING: WHAT CAN BE LEARNED FROM IT?
Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: D: yellow, West Wing Building, room 120
Group A – Session Chairs: Bärbel Barzel, Paul Drijvers

TSG TEAM PRESENTATION ON TOPICAL SURVEY AND TSG ROUND TABLE

Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: D: yellow, West Wing Building, room 120
Session Chair: Yiming Cao

Presentations: Brigitte Grugeon*
(LDAR UPEC)
ONLINE AUTOMATED ASSESSMENT AND STUDENT LEARNING:
THE PEPITE PROJECT IN ELEMENTARY ALGEBRA

Gilles Aldon*, Monica Panero
(Ecole Normale Supérieure de Lyon)
FORMATIVE ASSESSMENT IN MATHEMATICS AND SCIENCE:
WHICH ROLE FOR TECHNOLOGY?

Marja Van den Heuvel-Panhuizen (1,2), Ilona Friso-van den Bos* (2), Mieke Abels (1)
(1: Freudenthal Institute; 2: Freudenthal Group)
FORMATIVE ASSESSMENT IN MATHEMATICS EDUCATION BY USING TECHNOLOGY

Hana Ruchniewicz*
(University of Duisburg-Essen)
DEVELOPING A DIGITAL TOOL FOR FORMATIVE SELF-ASSESSMENT

Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30
Location: D: yellow, West Wing Building, room 120
Session Chair: Paul Drijvers

Presentations: Alison Clark-Wilson*
(UCL Institute of Education)
THE MULTI-FACETED ROLE OF TECHNOLOGY TO DEVELOP TEACHERS’ PROFESSIONAL
KNOWLEDGE AND PRACTICE TO USE DYNAMIC TECHNOLOGY

Lynda Ball* (1), Barbel Barzel (2)
(1: The University of Melbourne; 2: University of Duisburg-Essen)
COMMUNICATION AND COLLABORATION WHEN LEARNING AND TEACHING
MATHEMATICS WITH TECHNOLOGY
Aysun Sulun Tas (1), Serkan Özel* (1), Zeynep Ebrar Özel (2)
(1: Bogazici University; 2: Fatih University)
THE EFFECT OF MATHEMATICS ONLINE REVIEW SESSIONS THROUGH A WEBCAST SYSTEM ON 5TH-GRADE STUDENTS’ MATHEMATICS ACHIEVEMENT

TSG 43 – Uses of technology in upper secondary mathematics education (age 14 to 19)

Co-chairs: Colette Laborde (France), Stephen Hegedus (USA)
Team members: Luis Moreno Armella (Mexico), Hans-Stefan Siller (Germany), Michal Tabach (Israel)

First Session: Tuesday, 26 July 2016, 12.00 – 13.30
Location: G: green, Social Science Building, room 7
Session Chair: Colette Laborde

Presentations: Luis Moreno-Armella* (1), Corey Brady (2)
(1: Cinvestav-IPN; 2: Vanderbilt University)
TECHNOLOGY IN SECONDARY MATHEMATICS EDUCATION: THEORY

Sara Dalton* (1), Stephen Hegedus (2)
(1: Kaput Center for Research & Innovation in STEM Education; 2: Southern Connecticut State University)
THE ROLE OF NEW TECHNOLOGIES: CHANGING INTERACTIONS

Hans-Stefan Siller*
(Universität Koblenz-Landau)
INTERRELATIONS BETWEEN TECHNOLOGY AND MATHEMATICS

Michal Tabach* (1), Jana Trgalová (2)
(1: Tel-Aviv University; 2: Claude Bernard University)
TEACHER EDUCATION WITH TECHNOLOGY: WHAT, HOW AND WHY

Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: G: green, Social Science Building, room 7
Group A – Session Chair: Luis Moreno-Armella

Presentations: Ana Donevska-Todorova*
(Humboldt-Universität zu Berlin)
THINKING MODES, WITH OR WITHOUT TECHNOLOGY?

Håkan Sollervall*
(Linnaeus University)
TRANSFORMING A PROCEDURAL CALCULUS TASK INTO A STRUCTURED EXPLORATION WITH DYNAMIC REPRESENTATIONS

Location: G: green, Social Science Building, room 8
Group B – Session Chair: Stephen Hegedus

Presentations: Oi-Lam Ng*, Nathalie Sinclair
(Simon Fraser University)
DRAWING IN SPACE: DOING MATHEMATICS WITH 3D PENS
Gilbert Greefrath* (1), Hans-Stefan Siller (2)
(1: University of Muenster; 2: University of Koblenz-Landau)
GEOGEBRA AS A TOOL FOR SUPPORTING MODELLING PROCESSES

Daniel Thurm*
(University of Duisburg-Essen)
UNDERSTANDING TEACHER BELIEFS AND TECHNOLOGY INTEGRATION –
A BASIS FOR EFFECTIVE TEACHER EDUCATION

Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: G: green, Social Science Building, room 7
Group A – Session Chair: Michal Tabach

Presentations: Johannes Beck*
(Universität Würzburg)
A LINGUISTIC APPROACH TO CAS WRITTEN SOLUTIONS

Jana Trgalova (1), Mohamed El-Demerdash* (2), Oliver Labs (3), Jean-François Nicaud (4)
(1: S2HEP; 2: S2HEP; 3: University of Potsdam and MO-Labs; 4: ARISTOD)
COLLABORATIVE DESIGN OF EDUCATIONAL DIGITAL RESOURCES FOR PROMOTING CREATIVE MATHEMATICAL THINKING

Elayne Weger Bowman*
(Oklahoma Christian University)
EMBRACING GRAPHING CALCULATORS IN ALGEBRA II TO FACILITATE COMMON CORE STATE STANDARDS MASTERY

Location: G: green, Social Science Building, room 8
Group B – Session Chair: Colette Laborde

Presentations: Giulia Ferrari*, Francesca Ferrara
(Università di Torino)
DIAGRAMS AND TOOL USE: MAKING A CIRCLE WITH WIGRAPH

Morten Misfeldt* (1), Uffe Thomas Jankvist (2)
(1: Aalborg University; 2: Aarhus University)
INSTRUMENTAL GENESIS AND PROOF: UNDERSTANDING THE ROLES OF COMPUTER ALGEBRA SYSTEMS IN TEXTBOOK PROOFS

Tugçe Közakli* (1), Hatice Akkoç (2)
(1: Uludag University; 2: Marmara University)
EMERGING SOCIAL AND SOCIO-MATHMATICAL NORMS DURING TECHNOLOGY-ENHANCED LESSONS

Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30
Location: G: green, Social Science Building, room 7
Session Chairs: Colette Laborde, Stephen Hegedus

SUMMARY PRESENTATIONS AND GENERAL DISCUSSION INCLUDING SHOWCASE EXAMPLES OF ACTIVITIES

13th International Congress on Mathematical Education (ICME-13) · 24 – 31 July 2016 in Hamburg
TSG 44 – Distance learning, e-learning, blended learning

Co-chairs: Rúbia Barcelos Amaral (Brazil), Veronica Hoyos (Mexico)
Team members: Els de Geest (UK), Jason Silverman (USA), Rose Vogel (Germany)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: H: orange, Educational Building, room 211
Session Chair: Rose Vogel

Presentations:
- Fabian Mundt*, Mutfried Hartmann (University of Education Karlsruhe)
  QUALITY DESPITE QUANTITY – THE E:T:P:M@MATH CONCEPT FOR BLENDED LEARNING AT THE BEGINNING OF MATHEMATICAL STUDIES
- Kar Fu Yeung, Rachel Ka Wai Lui*, William Man Yin Cheung, Eddy Kwok Fai Lam, Nam Kiu Tsing (The University of Hong Kong)
  A CALCULUS E-LEARNING SYSTEM FOR FIRST-YEAR UNIVERSITY STUDENTS WITH DIVERSE MATHEMATICS BACKGROUND
- Karin Landenfeld*, Martin Göbbels, Antonia Hintze (Hochschule für Angewandte Wissenschaften)
  A CUSTOMIZED LEARNING ENVIRONMENT AND INDIVIDUAL LEARNING IN MATHEMATICAL PREPARATION COURSES
- Tatjana Hrubik-Vulanovic* (Kent State University at Stark)
  EVALUATION OF AN INTELLIGENT TUTORING SYSTEM THROUGH SUBSEQUENT MATHEMATICS COURSES

Second Session: Wednesday, 27 July 2016, 12.00–13.30
Location: H: orange, Educational Building, room 211
Session Chair: Rúbia Barcelos Amaral

Presentations:
- Arthur Powell (Rutgers University)
  COLLABORATIVE PRACTICES AND AWARENESS: EXTENDING MATHEMATICAL IDEAS THROUGH DISCursive AND INSCRIPTive, ONLINE INTERACTIONS
- Kadian M. Callahan* (1), Anne Marie S. Marshall (2)
  (1: Kennesaw State University; 2: Berry College)
  USING ONLINE DISCUSSIONS WITH IN-CLASS TASKS – A BLENDED INSTRUCTIONAL APPROACH FOR TEACHER EDUCATION
- Mandy Lo*, Julie-Ann Edwards, Christian Bokhove, Hugh Davis (University of Southampton)
  HANDWRITING RECOGNITION SOFTWARE AND STUDENTS’ ONLINE COLLABORATIVE LEARNING EXPERIENCE IN ALGEBRA STUDIES
Third Session: Friday, 29 July 2016, 12.00–13.30
Location: H: orange, Educational Building, room 211
Session Chair: Jason Silverman

Presentations: Elizabeth Fleming (1), Daniel Chazan* (1), Patricio Herbst (2), Dana Grosser-Clarkson (1)
(1: University of Maryland; 2: University of Michigan)
DESCRIBING CURRICULAR MATERIALS FOR MATHEMATICS TEACHER EDUCATION IN AN ONLINE, RICH MEDIA PLATFORM

Cosette Crisan*
(UCL Institute of Education)
USING VIDEO CASES IN AN ONLINE COURSE: SUPPORTING TEACHERS IN DEVELOPING THEIR RITPACK

Tamar Ann Avineri, Hollylynne Lee, Dung Tran, Jennifer Lovett*, Theresa Gibson
(North Carolina State University)
DESIGN AND IMPACT OF MOOCS FOR MATHEMATICS TEACHERS

Yaniv Biton* (1), Osnat Fellus (2)
(1: Technion – Israel Institute of Technology; 2: University of Ottawa)
PROFESSIONAL DISTANCE LEARNING COMMUNITY: A CASE STUDY – MATHEMATICS IN THE VIRTUAL HIGH SCHOOL

Fourth Session: Saturday, 30 July 2016, 12.00–13.30
Location: H: orange, Educational Building, room 211
Session Chair: Veronica Hoyos

Presentations: Marcelo Borba*
(Universidade Estadual Paulista Júlio de Mesquita Filho)
A SURVEY ON MATHEMATICS EDUCATION AND TECHNOLOGY

Giovannina Albano* (1), Maria Polo (2), Pier Luigi Ferrari (3)
(1: University of Salerno; 2: University of Cagliari; 3: University of Piemonte Orientale)
MATHEMATICS ONLINE COMMUNITY AT UNIVERSITY LEVEL

Angela María Restrepo*
(Universidad de los Andes)
EMERGENCE AND SUSTAINABILITY OF COMMUNITIES OF PRACTICE IN THE MOOC EFAN MATHS
TSG 45 – Knowledge in/for teaching mathematics at primary level

Co-chairs: Carolyn Maher (USA), Peter Sullivan (Australia)
Team members: Hedwig Gasteiger (Germany), Soo Jin Lee (Korea)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: E: mint, Economical Building, lecture hall B
Session Chair: Peter Sullivan

Presentations:
- Peter Sullivan* (Monash University)
  SUPPORTING TEACHERS IN IMPROVING THEIR KNOWLEDGE OF MATHEMATICS
- Hedwig Gasteiger* (1), Christiane Benz (2)
  (1: LMU München; 2: PH Karlsruhe)
  PROFESSIONAL KNOWLEDGE FOR EARLY MATHEMATICS EDUCATION
- Axel Schulz* (Bielefeld University)
  DIAGNOSTIC KNOWLEDGE TO IDENTIFY LEARNING DIFFICULTIES AND FOSTER MATHEMATICAL LEARNING

Second Session: Wednesday, 27 July 2016, 12.00–13.30
Location: E: mint, Economical Building, lecture hall B
Session Chair: Carolyn A. Maher

Presentations:
- Robert Sigley*, Carolyn A. Maher (Rutgers University)
  TEACHER LEARNING ABOUT MATHEMATICAL REASONING: AN INSTRUCTIONAL MODEL
- Soo Jin Lee*, Jaehong Shin (Korea National University of Education)
  KEY DEVELOPMENTAL UNDERSTANDINGS-BASED TEXTBOOK ANALYSIS: FRACTION ADDITION AND MULTIPLICATION
- Sharyn Lee Livy* (Monash University)
  MINIMISING THE LESSON INTRODUCTION PROVIDES AN OPPORTUNITY FOR STUDENTS TO WORK IT OUT THEMSELVES

Third Session: Friday, 29 July 2016, 12.00–13.30
Location: E: mint, Economical Building, lecture hall B
Session Chair: Doug Clarke

Presentations:
- Doug Clarke*, Anne Roche (Australian Catholic University)
  USING TASKS FROM CONTEXTS TO ENGAGE STUDENTS IN MEANINGFUL AND WORTHWHILE LEARNING
Topic Study Groups

Therese Dooley*
(Dublin City University)
PUPILS AS KNOWLEDGE AGENTS AND MONITORS IN THE CONSTRUCTION OF MATHEMATICAL IDEAS

Brenda Bicknell *, Jenny Young-Loveridge
(The University of Waikato)
USING TASK DESIGN TO BUILD TEACHER KNOWLEDGE

Fourth Session: Saturday, 30 July 2016, 12.00 –13.30
Location: E: mint, Economical Building, lecture hall B
Session Chair: Louise Wilkinson

Presentations: Louise Wilkinson*
(Syracuse University)
TEACHING THE LANGUAGE OF MATHEMATICS: WHAT TEACHERS NEED TO KNOW AND DO

Dennis Meyer*
(Universität Hamburg)
STRUCTURE AND DEVELOPMENT OF PRIMARY TEACHER’S PROFESSIONAL COMPETENCIES

Martina Hoffmann*
(University of Duisburg-Essen)
TEACHERS’ COMPETENCES IN DIAGNOSTIC AND SUPPORT IN INCLUSIVE MATHEMATICS EDUCATION – A RESEARCH PROJECT

TSG 46 – Knowledge in/for teaching mathematics at secondary level

Co-chairs: Ruhama Even (Israel), Xinrong Yang (China)
Team members: Nils Buchholz (Germany), Charalambos Charalambous (Cyprus),
Tim Rowland (Great Britain)

First Session: Tuesday, 26 July 2016, 12.00 –13.30
Location: D: yellow, West Wing Building, room 121
Session Chairs: Nils Buchholz, Tim Rowland

Presentations: Michael Neubrand *
(University of Oldenburg)
CONCEPTUALIZATION AND THEORIZATION OF KNOWLEDGE IN/FOR TEACHING MATHEMATICS AT THE SECONDARY LEVEL

Aiso Heinze*, Anke Lindmeier, Anika Dreher
(IPN Kiel)
ACADEMIC MATHEMATICS OR SCHOOL MATHEMATICS?
WHAT KIND OF CONTENT KNOWLEDGE DO MATHEMATICS TEACHERS NEED?

Tim Rowland* (1,2), Anne Thwaites (2), Libby Jared (2)
(1: University of East Anglia; 2: University of Cambridge)
ANALYSING SECONDARY MATHEMATICS TEACHING WITH THE KNOWLEDGE QUARTET
Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: D: yellow, West Wing Building, room 121
Session Chairs: Charalambous Charalambous, Xinrong Yang

Presentations: Heather Hill* (Harvard Graduate School of Education)
MEASURING SECONDARY TEACHERS’ KNOWLEDGE OF TEACHING MATHEMATICS

Dragana Martinovic* (1), Agida Manizade (2)
(1: University of Windsor; 2: Radford University)
CONCEPTUALIZING KNOWLEDGE FOR TEACHING GEOMETRY AT THE SECONDARY LEVEL

Lena Schlesinger*, Armin Jentsch (Universität Hamburg)
MEASURING INSTRUCTIONAL QUALITY IN MATHEMATICS EDUCATION

Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: D: yellow, West Wing Building, room 121
Session Chair: Ruhama Even

Presentations: Nicholas H. Wasserman* (Teachers College)
ACCOMMODATION OF TEACHERS’ KNOWLEDGE OF INVERSE FUNCTIONS WITH THE GROUP OF INVERTIBLE FUNCTIONS

Haode Zuo*, Frederick K. S. Leung (The University of Hong Kong)
SENIOR SECONDARY SCHOOL TEACHERS’ HIGHER MATHEMATICS KNOWLEDGE AND THE CLASSROOM INSTRUCTIONS IN CHINA

Ruhama Even* (Weizmann Institute of Science)
TEACHERS’ VIEWS ON THE RELEVANCE OF ADVANCED MATHEMATICS STUDIES TO SECONDARY SCHOOL TEACHING

Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30
Location: D: yellow, West Wing Building, room 121
Session Chairs: Xinrong Yang, Ruhama Even

Presentations: Xinrong Yang (Southwest University)
REFLECTION ON THE CONNECTIONS BETWEEN KNOWLEDGE AND PRACTICE OF TEACHING MATHEMATICS

Nils Buchholtz (Universität Hamburg)
SUMMARY OF THE DISCUSSION AND REFLECTIONS ON FURTHER PROGRESS

Charalambos Charalambous (University of Cyprus)
MEASURING, ASSESSING, AND EVALUATING KNOWLEDGE IN / FOR TEACHING MATHEMATICS AT THE SECONDARY LEVEL: LOOKING BACK AND LOOKING FORWARD
TSG 47 – Pre-service mathematics education of primary teachers

Co-chairs: Keiko Hino (Japan), Gabriel Stylianides (UK)
Team members: Katja Eilerts (Germany), Caroline Lajoie (Canada), David Pugalee (USA)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: G: green, Social Science Building, room 29
Session Chair: Gabriel Stylianides

Presentations: Fou-Lai Lin* (1), Hui-Yu Hsu (2)
(1: National Taiwan Normal University; 2: National Hsinchu University of Education)
USING MATHEMATICS-PEDAGOGY TASKS TO FACILITATE PROFESSIONAL GROWTH OF ELEMENTARY PRE-SERVICE TEACHERS

Roland Pilous* (1,2), Timo Leuders (2), Christian Rüede (1,2)
(1: FHNW School of Education; 2: University of Education Freiburg)
INVESTIGATING THE RELATIONSHIP BETWEEN PROSPECTIVE ELEMENTARY TEACHERS’ MATH-SPECIFIC KNOWLEDGE DOMAINS

Jane-Jane Lo*
(Western Michigan University)
A SELF-STUDY OF INTEGRATING COMPUTER TECHNOLOGY IN A GEOMETRY COURSE FOR PROSPECTIVE ELEMENTARY TEACHERS

Ryan Fox*
(Belmont University)
PRE-SERVICE ELEMENTARY TEACHERS GENERATION OF MULTIPLE REPRESENTATIONS TO WORD PROBLEMS INVOLVING PROPORTIONS

Second Session: Wednesday, 27 July 2016, 12.00–13.30
Location: G: green, Social Science Building, room 29
Session Chair: Keiko Hino

Presentations: Skip Fennell*
(McDaniel College)
PREPARING ELEMENTARY SCHOOL TEACHERS OF MATHEMATICS: A CONTINUING CHALLENGE

Marjolein Kool* (1), Ronald Keijzer (2)
(1: Hogeschool Utrecht; 2: Hogeschool iPabo)
DESIGNING NON-Routine MATHEMATICAL PROBLEMS AS A CHALLENGE FOR HIGH-PERFORMING PROSPECTIVE TEACHERS

Eda Vula*, Jeta Kingji-Kastrati
(University of Pristina)
PRESERVICE TEACHERS’ PROCEDURAL AND CONCEPTUAL UNDERSTANDING OF FRACTIONS

Meghan Shaughnessy*, Timothy Boerst
(University of Michigan)
APPRaising THE SKILLS FOR ELICITING STUDENT THINKING THAT PRESERVICE TEACHERS BRING TO TEACHER EDUCATION
**Topic Study Groups**

**Third Session: Friday, 29 July 2016, 12.00 – 13.30**
**Location: G: green, Social Science Building, room 29**
**Group A – Session Chair: Gabriel Styliandes**

Presentations: Yusuke Shinno* (1), Tomoko Yanagimoto (1), Katsuhiro Uno (2)
(1: Osaka Kyoiku University; 2: Osaka University)
**A STUDY OF PROSPECTIVE PRIMARY TEACHERS’ ARGUMENTATION IN TERMS OF MATHEMATICAL KNOWLEDGE FOR TEACHING AND EVALUATING**

Stephanie Schuler*, Gerald Wittmann
(Pädagogische Hochschule Freiburg)
**IMAGE VIGNETTES TO MEASURE PROSPECTIVE TEACHERS’ BELIEFS ABOUT MATHEMATICS TEACHING AND LEARNING**

Gönül Güne *
(Karadeniz Technical University)
**THE MATHEMATICS BACKGROUNDS AND MATHEMATICS SELF-EFFICACY PERCEPTIONS OF PRE-SERVICE PRIMARY SCHOOL TEACHERS**

Erik Jacobson*, Fetiye Aydeniz, Mark Creager, Michael Daiga, Erol Uzan
(Indiana University)
**DEVELOPING TOGETHER: MEASURING PROSPECTIVE TEACHERS’ INTERTWINED, TOPIC-SPECIFIC KNOWLEDGE AND BELIEFS**

**Location: G: green, Social Science Building, room A215**
**Group B – Session Chair: Keiko Hino**

Presentations: Derya Çelik* (1), Serhat Aydin (2), Zeynep Medine Özmen (1), Kadir Gürsoy (1), Duygu Taskın (1), Mustafa Güler (1), Gökay Açıkylıdz (1), Gönül Güne (1), Ramazan Gürbüz (3), Osman Birgin (4)
(1: Karadeniz Technical University; 2: Celal Bayar University; 3: Adıyaman University; 4: Usak University)
**PRESERVICE MATHEMATICS TEACHERS’ GAINS FOR TEACHING DIVERSE STUDENTS**

Elisabeta Eriksen (1), Yvette Solomon (1,2), Camilla Rodal (1), Bjørn Smestad* (1), Annette Hessen Bjørke (1)
(1: Oslo and Akershus University College of Applied Sciences; 2: Manchester Metropolitan University)
**THE DAY WILL COME WHEN I WILL THINK THIS IS FUN – FIRST-YEAR PRE-SERVICE TEACHERS’ REFLECTIONS ON BECOMING MATHEMATICS**

Oguzhan Dogan*, Hülya Kliç
(Yeditepe University)
**LEARNING AND TEACHING WITH TEACHER CANDIDATES: AN ACTION RESEARCH FOR MODELING AND BUILDING FACULTY SCHOOL COOPERATION**

Wenjuan Li*, Alison Castro Superfine
(University of Illinois at Chicago)
**UNDERSTANDING THE WORK OF MATHEMATICS TEACHER EDUCATORS: A KNOWLEDGE OF PRACTICE PERSPECTIVE**
**Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30**
**Location: G: green, Social Science Building, room 29**
Session Chair: Gabriel Styliandes

Presentations: Caroline *Lajoie*
(Université du Québec à Montréal)
LEARNING TO ACT IN-THE-MOMENT: PROSPECTIVE ELEMENTARY TEACHERS’ ROLEPLAYING ON NUMBERS

Pere *Ivars*, Ceneida *Fernández*
(Universidad de Alicante)
THE ROLE OF WRITING NARRATIVES IN DEVELOPING PRE-SERVICE PRIMARY TEACHERS NOTICING

Dittika *Gupta* (1), Melissa *Soto* (2), Lara *Dick* (3), Shawn *Broderick* (4), Mollie *Appelgate* (5)
(1: Midwestern State University; 2: San Diego State University; 3: Bucknell University; 4: Keene State College; 5: Iowa State University)
NOTICING AND DECIDING THE “NEXT STEPS” FOR TEACHING: A CROSS-UNIVERSITY STUDY WITH ELEMENTARY PRE-SERVICE TEACHERS

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**TSG 48 – Pre-service mathematics education of secondary teachers**

Co-chairs: Rongjin *Huang* (USA), Marilyn E. *Strutchens* (USA)
Team members: Leticia Losano (Argentina), Despina Potari (Greece), Björn Schwarz (Germany)

**First Session: Tuesday, 26 July 2016, 12.00 – 13.30**
**Location: G: green, Social Science Building, room 28**
Session Chair: Despina *Potari*

Presentations: Joao Pedro *da Ponte* (Instituto de Educação)
LESSON STUDIES IN PRESERVICE TEACHER EDUCATION

Alberto *Arnal-Bailera* (1), Eva *Cid* (1), José M. *Muñoz-Escolano* (1), Antonio M. *Oller-Marcén* (2)
(1: Universidad de Zaragoza; 2: Centro Universitario de la Defensa de Zaragoza)
MARKING MATHEMATICS EXAMS AS A TOOL FOR SECONDARY TEACHER TRAINING

Péter *Juhász*, Anna *Kiss*, Ryota *Matsuura*, Réka Judit *Szász* (Budapest Semesters in Mathematics Education)
DEVELOPING TEACHER KNOWLEDGE IN PRESERVICE TEACHERS THROUGH PROBLEM SOLVING AND REFLECTION

Fou-Lai *Lin*, Kai-Lin *Yang*, Yu-Ping *Chang* (National Taiwan Normal University)
DESIGNING A COMPETENCE-BASED ENTRY COURSE FOR PROSPECTIVE SECONDARY MATHEMATICS TEACHERS
**Second Session: Wednesday, 27 July 2016, 12.00 – 13.30**

**Location: G: green, Social Science Building, room 28**

**Group A** – Session Chair: Despina Potari

Presentations: Azita Manouchehri* (The Ohio State University)

INFUSING MATHEMATICAL MODELING IN TEACHER PREPARATION: CHALLENGES AND OUTCOMES

Yu-Ping Chang, Kai-Lin Yang* (National Taiwan Normal University)

APOS THEORY APPLIED TO IDENTIFY KEY CHALLENGES FOR IMPROVING PROSPECTIVE MATHEMATICS TEACHERS’ TEACHING

Jung Sook Park* (1), Kukhwan Oh (1), Oh Nam Kwon (2)

AN EXPLORATORY STUDY ON THE PROSPECTIVE TEACHERS’ LESSON OF ANALYZING MATH TEXTBOOKS

Ibrahim Burak Olmez*, Andrew Izsak, Sybilla Beckmann (The University of Georgia)

FUTURE TEACHERS’ USE OF MULTIPLICATION AND FRACTIONS WHEN EXPRESSING PROPORTIONAL RELATIONSHIPS

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**Location: G: green, Social Science Building, room 30**

**Group B** – Session Chair: Leticia Losano

Presentations: Márcia Cristina de Costa Trindade Cyrino* (Universidade Estadual de Londrina)

TEACHER PROFESSIONAL IDENTITY CONSTRUCTION IN PRE-SERVICE MATHEMATICS TEACHER EDUCATION: ANALYSING A MULTIMEDIA CASE

Belinda Pickett Edwards*, Desha Williams (Kennesaw State University)

PRE-SERVICE MATHEMATICS TEACHERS’ EXPERIENCES DEVELOPING A CULTURALLY RESPONSIVE TEACHER IDENTITY

Gregory Stephen Colin Hine* (The University of Notre Dame Australia)

EXPLORING PRE-SERVICE TEACHERS’ SELF-PERCEPTIONS OF READINESS TO TEACH MATHEMATICS

Rina Durandt*, Gerrie J. Jacobs (University of Johannesburg)

PRE-SERVICE TEACHERS’ ATTITUDES TOWARDS MATHEMATICAL MODELLING
Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: G: green, Social Science Building, room 28
Group A – Session Chair: Marilyn Strutchens

Presentations: Blake E. Peterson*, Keith R. Leatham
(Brigham Young University)
THE STRUCTURE OF STUDENT TEACHING CAN CHANGE THE FOCUS TO STUDENTS’ MATHEMATICAL THINKING

W. Gary Martin*, Marilyn E. Strutchens
(Auburn University)
TRANSFORMING SECONDARY MATHEMATICS TEACHER PREPARATION VIA A NETWORKED IMPROVEMENT COMMUNITY

Ahmet Oguz Akcay*, Melissa Boston
(Duquesne University)
AN EXAMINATION OF PRE-SERVICE MATHEMATICS TEACHERS’ INTEGRATION OF TECHNOLOGY INTO INSTRUCTIONAL ACTIVITIES

Despina Potari* (1,2), Giorgos Psycharis (1)
(1: National and Kapodistrian University of Athens; 2: Linneaus University)
PROSPECTIVE MATHEMATICS TEACHERS’ ARGUMENTATION WHILE INTERPRETING CLASSROOM INCIDENTS

Location: G: green, Social Science Building, room 30
Group B – Session Chair: Rongjin Huang

Presentations: Rose Mary Zbiek*
(The Pennsylvania State University)
FRAMING SECONDARY MATHEMATICS TEACHER UNDERSTANDING

Tingyan Zhang*
(Southwest University)
AN INVESTIGATION OF PRE-SERVICE MATHEMATICS TEACHERS’ TECHNOLOGY PEDAGOGICAL CONTENT KNOWLEDGE IN CHINA

Mar Moreno*, Salvador Llinares
(UNIVERSITY OF ALICANTE)
PROSPECTIVE SECONDARY MATHEMATICS TEACHERS’ PERSPECTIVES ABOUT THE USE OF TECHNOLOGY FOR SUPPORTING THE MATHS LEARNING

Yingkang Wu*
(East China Normal University)
PROMOTING PRE-SERVICE SECONDARY MATHEMATICS TEACHERS’ LEARNING TO TEACH MATHEMATICS: A VIDEO-BASED APPROACH

Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30
Location: G: green, Social Science Building, room 28
Session Chair: Marilyn Strutchens

Presentations: Hulya Kilic*
(Yeditepe University)
PRE-SERVICE TEACHERS’ REFLECTION ON THEIR TEACHING
Matthias Heinrich*
(Universität Oldenburg)
CONSEQUENCES FROM THE LEARNING LEVEL OF STUDENTS FOR THE LESSON PLANNING IN MATHEMATICS

Christa DeAnn Jackson* (1), Magaret Mohr-Schroeder (2)
(1: Iowa State University; 2: University of Kentucky)
INCREASING STEM LITERACY VIA AN INFORMAL LEARNING ENVIRONMENT

Leticia Losano*, Mónica Villarreal
(Consejo nacional de investigaciones Científicas y Técnicas – Facultad de Matemática)
PROSPECTIVE TEACHERS WORKING TOGETHER BEFORE AND DURING THEIR FIRST TEACHING PRACTICES

TSG 49 – In-service education and professional development of primary mathematics teachers

Co-chairs: Akihiko Takahashi (USA), Leonor Varas (Chile)
Team members: Toshiakira Fuji (Japan), Kim Ramatlapana (Botswana), Christoph Selter (Germany)

First Session: Tuesday, 26 July 2016, 12.00 – 13.30
Location: E: mint, Economical Building, room 2098/2194
Session Chair: Kim Ramatlapana

Presentations: Akihiko Takahashi*
(DePaul University)
COLLABORATIVE LESSON RESEARCH (CLR)

Stéphane Clivaz* (1), Aoibhinn Ní Shúilleabháin (2)
(1: Lausanne Laboratory Lesson Study; 2: School of Mathematics & Statistics)
DEVELOPING MATHEMATICAL KNOWLEDGE FOR TEACHING IN LESSON STUDY: PROPOSITIONS FOR A THEORETICAL FRAMEWORK

Toshiakira Fuji (Japan)
LESSON PLANNING IN JAPANESE ELEMENTARY SCHOOL LESSON STUDY

Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: E: mint, Economical Building, room 2098/2194
Group A – Session Chair: Akihiko Takahashi

Presentations: Hamsa Venkat (1), Mike Askew* (1), Lawan Abdulhamid (1), Samantha Morrison (1), Kim Ramatlapana (2)
(1: University of the Witwatersrand; 2: University of Johannesburg)
A MEDIATIONAL APPROACH TO EXPANDING IN-SERVICE PRIMARY TEACHERS’ MATHEMATICAL DISCUSSION IN INSTRUCTION
ENHANCING IN-SERVICE ELEMENTARY MATHEMATICS TEACHERS’ CONTENT KNOWLEDGE: A DISCUSSION OF TWO U.S. MSP PROJECTS

Nicole Panorkou* (1), Jennifer L. Kobrin (2)
(1: Montclair State University; 2: Research & Innovation Network)
ENHANCING TEACHERS’ FORMATIVE ASSESSMENT PRACTICES: USING LEARNING TRAJECTORIES IN PROFESSIONAL DEVELOPMENT

Dovie Kimmins*, Rongjin Huang, Jeremy Winters, Kristin Hartland
(Middle Tennessee State University)
IN-SERVICE TEACHERS’ PERCEPTIONS AND INTERPRETATIONS OF A LEARNING TRAJECTORY: DIVISION OF FRACTIONS

Location: E: mint, Economical Building, room 2095/2197
Group B – Session Chair: Christoph Selter

Presentations: Cynthia Seto* (1), Mei Yoke Loh (2)
(1: Academy of Singapore Teachers / MOE; 2: Curriculum Planning and Development Division / MOE)
MENTORING AND MATHEMATICS TEACHER NOTICING: ENHANCING TEACHER KNOWLEDGE

Armando Peri* (1,2,3), Carmen Gloria Espinoza (1,2), Lisa Darragh (3)
(1: University of Chile; 2: Center for Mathematical Modelling; 3: Center for Advanced Research in Education)
QUESTIONS AND QUALITY OF CLASSROOM INSTRUCTION OF MATH AFTER A PROFESSIONAL DEVELOPMENT

Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: E: mint, Economical Building, room 2098/2194
Group A – Session Chair: Leonor Varas

Presentations: Salome Martinez*, Leonor Varas
(Universidad de Chile)
ON THE DEVELOPMENT OF A COLLABORATIVE PARTNERSHIP MODEL INVOLVING IN-SERVICE TEACHERS AND RESEARCHERS

Engin Ader*
(Bogazici University)
INVESTIGATING CLASSROOM TEACHERS’ DEVELOPMENT OF QUALITY OF IMPLEMENTATION OF MATHEMATICAL TASKS

Flavio Guíñez*, Salomé Martinez
(Universidad de Chile)
A B-LEARNING APPROACH TO DEVELOPING MATHEMATICAL KNOWLEDGE FOR TEACHING FOR IN-SERVICE PRIMARY SCHOOL TEACHERS

M. Victoria Martinez*, Leonor Varas
(University of Chile)
IDENTIFYING ELEMENTS OF TEACHERS’ CHANGE IN A PROFESSIONAL DEVELOPMENT EXPERIENCE
Location: E: mint, Economical Building, room 2095/2197
Group B – Session Chair: Akihiko Takahashi

Presentations: Florence Anne Glanfield* (1), Joyce Mgombelo (2), Elaine Simmt (1), Andrew Binde (3)
(1: University of Alberta; 2: Brock University; 3: University of Dodoma)
PRIMARY MATHEMATICS TEACHER DEVELOPMENT IN RURAL COMMUNITIES:
LESSONS LEARNED FROM AN INTERNATIONAL RESEARCH PARTNERSHIP

Julie M. Amador (1), Cory A. Bennett* (2), Christine Avila (3)
(1: University of Idaho; 2: Idaho State University; 3: Fresno Pacific University)
UNDERSTANDING RURAL TEACHERS’ PERCEIVED NEEDS AND CHALLENGES IN
CREATING RICH LEARNING ENVIRONMENTS

Liora Nutov* (1), Atara Sriki (2)
(1: Gordon Academic Colege and Technion; 2: Oranim College)
TEACHER AND STUDENTS AS A COLLABORATIVE INQUIRY LEARNING COMMUNITY:
A MEANS FOR TEACHERS’ PROFESSIONAL DEVELOPMENT

Fourth Session: Saturday, 30 July 2016, 12.00–13.30
Location: E: mint, Economical Building, room 2098/2194
Session Chair: Toshiakira Fujii

Presentations: Debbie Morgan*
(The National Centre for Excellence in the Teaching of Mathematics)
TEACHING FOR MASTERY A STRATEGY FOR IMPROVING ATTAINMENT IN
MATHEMATICS IN ENGLISH PRIMARY SCHOOLS

Christoph Selter*
(TU Dortmund)
THE PIKAS PROJECT – USING KNOWLEDGE GAINED FROM IMPLEMENTATION,
SCHOOL DEVELOPMENT& IN-SERVICE TEACHER TRAINING RESEARCH

Jónína Vala Kristinsdóttir*
(University of Iceland)
CO-LEARNING PARTNERSHIP IN MATHEMATICS TEACHER IN-SERVICE EDUCATION

Analucia Dias Schliemann* (1), David William Carraher (2), Montserrat Teixidor-i-Bigas (1)
(1: Tufts University; 2: TERC)
TEACHER DEVELOPMENT AND STUDENT LEARNING

TSG 50 – In-service education, and professional development of secondary mathematics teachers

Co-chairs: Jill Adler (South Africa), Yudong Yang (China)
Team members: Hilda Borko (USA), Konrad Krainer (Austria), Sitti Patahuddin (Australia)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: C: turquoise, Main Building, lecture hall B
Session Chairs: Jill Adler, Yudong Yang

PANEL DISCUSSION
Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: C: turquoise, Main Building, lecture hall B
Group A – Session Chair: Sitti Patahuddin

Presentations: Ronnie Karsenty, Gil Schwarts* (Weizmann Institute of Science)
ENHANCING REFLECTIVE SKILLS OF SECONDARY MATHEMATICS TEACHERS VIA VIDEO-BASED PEER DISCUSSIONS: A CROSS-CULTURAL STORY

Cathrine Kazunga*, Sarah Bansilal (University of Kwa-Zulu Natal)
THE CHALLENGES OF UPGRADING MATHEMATICS TEACHERS: A CASE STUDY FROM ONE DEVELOPING COUNTRY

Susanne Schnell* (University of Cologne)
TEACHERS NOTICING STUDENTS’ POTENTIALS WHILE ANALYSING VIDEO CLIPS

Müjgan Baki* (Karadeniz Technical University)
DEVELOPMENT OF MATHEMATICAL KNOWLEDGE FOR TEACHING OF MATHEMATICS TEACHERS IN LESSON ANALYSIS PROCESS

Location: C: turquoise, Main Building, lecture hall K
Group B – Session Chair: Yudong Yang

Presentations: Uffe Thomas Jankvist* (1), Mogens Niss (2) (1: Aarhus University, 2: Roskilde University)
FOSTERING AN INTIMATE INTERPLAY BETWEEN RESEARCH AND PRACTICE: DANISH “MATHS COUNSELLORS” FOR UPPER SECONDARY SCHOOL

Marta Kobiela*, Annie Savard, Scosha Merovitz, Vandana Chandrasekhar (McGill University)
OPPORTUNITIES FOR LEARNING OF SECONDARY MATH TEACHER LEADERS IN THE CONTEXT OF A VIDEO CLUB

Ada Boufi* (National and Kapodistrian University of Athens)
DISTRICT COACHES FACILITATING TEACHERS’ USE OF INQUIRY-ORIENTED MATH TEXTBOOKS: A PROFESSIONAL DEVELOPMENT DESIGN STUDY

Corinne Rose Glennie*, Bárbara Brizuela (Tufts University)
THE ROLE OF FACILITATOR FEEDBACK IN SHAPING TEACHER ATTENTION AND RESPONSE TO STUDENT THINKING
Third Session: Friday, 29 July 2016, 12.00 – 13.30  
Location: C: turquoise, Main Building, lecture hall B  
Group A – Session Chair: Jill Adler

Presentations: Ulla B. Ch. Runesson Kempe* (Jönköping University)
LEARNING STUDY AND THE IDEA OF VARIATION AND CRITICAL ASPECTS OF LEARNING

Erlina Ronda* (University of the Philippines)
SUPPORTING TEACHERS IN AMBITIOUS MATHEMATICS TEACHING

Lisa Karin Österling* (Stockholm University)
(IN)VISIBLE THEORY IN MATHEMATICS TEACHER EDUCATION

Mary Grace Stevenson* (Liverpool Hope University)
DEVELOPING MATHEMATICAL IDENTITY AND ‘UNDERSTANDING MATHEMATICS IN DEPTH’: CONCEPTIONS OF SECONDARY MATHEMATICS TEACHERS

Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30  
Location: C: turquoise, Main Building, lecture hall B  
Session Chair: Konrad Krainer

Presentations: Thomas M. Smith* (1), Hilda Borko (2), Paola Sztajn (3)  
(1: University of California; 2: Stanford University; 3: North Carolina State University)
ATTENDING TO CONTEXT WHEN DESIGNING MATHEMATICS PROFESSIONAL DEVELOPMENT WITH SCALE IN MIND

Stefan Zehetmeier* (University of Klagenfurt)
RESEARCHING THE SUSTAINABILITY OF PROFESSIONAL DEVELOPMENT PROGRAMMES
Craig Pournara*
(University of the Witwatersrand)
IMPROVING TEACHERS’ MATHEMATICAL CONTENT KNOWLEDGE AND THE IMPACT ON LEARNER ATTAINMENT

Fou-Lai Lin, Kai-Lin Yang, Ting-Ying Wang*
(National Taiwan Normal University)
TRANSFORMATIVE CASCADE MODEL FOR MATHEMATICS TEACHER PROFESSIONAL DEVELOPMENT

TSG 51 – Diversity of theories in mathematics education

Co-chairs: Tommy Dreyfus (Israel), Anna Sierpinska (Canada)
Team members: Stefan Halverscheid (Germany), Steve Lerman (UK), Takeshi Miyakawa (Japan)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: H: orange, Educational Building, room 207
Session Chair: Stefan Halverscheid

Presentations: Anna Sfard*
(The University of Haifa)
ON THE NEED FOR THEORY OF MATHEMATICS LEARNING AND THE PROMISE OF “COMMONGNITION”

Cristina Frade*
(Universidade Federal de Minas Gerais – UFMG)
THE SOCIAL CONSTRUCTION OF MATHEMATICS TEACHER’S IDENTITY: RORTY’S PRAGMATISTIC PERSPECTIVE

Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: H: orange, Educational Building, room 207
Session Chair: Steve Lerman

Presentations: Ricardo Cantoral*
(Cinvestav)
ORIGINS AND EVOLUTION OF THE SOCIOEPISTEMOLOGICAL PROGRAM IN MATHEMATICS EDUCATION

Carolina Tamayo Osorio*, Antonio Miguel
(Universidade Estadual de Campinas)
WITTGENSTEINIAN “THERAPEUTIC COUCH” AND INDIGENOUS EXPERIENCE IN (MATHEMATICS) EDUCATION

Higinio Dominguez*
(Michigan State University)
RECIPROCAL NOTICING IN MATHEMATICS CLASSROOMS WITH NON-DOMINANT STUDENTS
**Third Session: Friday, 29 July 2016, 12.00 – 13.30**  
**Location:** H: orange, Educational Building, room 207  
Session Chair: Takeshi Miyakawa

Presentations: Yasuhiro Sekiguchi*  
(Yamaguchi University)  
**THEORIES AND TRADITIONS: TENSIONS BETWEEN MATHEMATICS TEACHING PRACTICES AND A RECENT SCHOOL REFORM IN JAPAN**

Verena Rembowski*  
(Saarland University)  
**SEMIOTIC AND PHILOSOPHICAL-PSYCHOLOGICAL ASPECTS OF CONCEPT FORMATION – UNITED**

Stefan Halverscheid*  
(Georg-August-Universität)  
**AN EXAMPLE FOR INTERDISCIPLINARY NETWORKING OF THEORIES FOR THE DESIGN OF MODELLING TASKS: A CASE STUDY ON ETHICAL DILEM**

**Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30**  
**Location:** H: orange, Educational Building, room 207

Session Chair: Alain Kuzniak

Presentations: Michèle Artigue*  
(University Paris Diderot – Paris 7)  
**THE CHALLENGING DIVERSITY OF THEORIES IN MATHEMATICS EDUCATION**

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**TSG 52 – Empirical methods and methodologies**

Co-chairs: David Clarke (Australia), Alan Schoenfeld (USA)  
Team members: Bagele Chilisa (Botswana), Paul Cobb (USA), Christine Knipping (Germany)

**First Session: Tuesday, 26 July 2016, 12.00 – 13.30**  
**Location:** K: purple, Law Building, room 1+2  
**Group A – Session Chair:** Alan Schoenfeld

Presentations: Armin Jentsch*, Lena Schlesinger  
(University of Hamburg)  
**METHODOLOGICAL CHALLENGES IN MEASURING INSTRUCTIONAL QUALITY IN MATHEMATICS CLASSROOMS**

Branchetti Laura (1), Chiara Giberti* (2), Bolondi Giorgio (3)  
(1: University of Palermo; 2: University of Trento; 3: University of Bologna)  
**A TOOL FOR ANALYZING THE IMPACT OF THE FORMULATION ON THE PERFORMANCE OF STUDENTS ANSWERING TO A MATHEMATICAL ITEM**

Todd M. Milford* (1), Kevin Larkin (2)  
(1: University of Victoria; 2: Griffith University)  
**CLUSTER ANALYSIS: A NOVEL METHODOLOGICAL APPROACH TO DETERMINING QUALITY IN GEOMETRY APPS**
**Location:** K: purple, Law Building, room 9  
**Group B – Session Chair: Paul Cobb**

Presentations: Enrique Garcia **Moreno-Esteva** (1), Markku **Hannula** (2), Miika **Toivanen** (3)  
(1: University of Helsinki and The English School; 2: University of Helsinki; 3: Finnish Institute of Occupational Health)

*WHEN DOES VISUAL INFORMATION BECOME RELEVANT IN A DYNAMIC PROBLEM SOLVING TASK IN THE CLASSROOM? – AN EYE TRACKING STUDY*

Man Ching Esther **Chan***, David John **Clarke**  
(The University of Melbourne)  
**LEARNING RESEARCH IN A LABORATORY CLASSROOM**

Na **Li***, Ida Ah Chee **Mok**  
(China)  
**SOME ISSUES ON THE CODING OF CLASSROOM INTERACTION**

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**Second Session: Wednesday, 27 July 2016, 12.00 – 13.30**  
**Location:** K: purple, Law Building, room 1+2  
**Group A – Session Chair: Paul Cobb**

Presentations: Minsung **Kwon***, Mark **Hoover**  
(University of Michigan)  
**ISOLATING KEY COMPONENTS OF INSTRUCTION AS A BASIS FOR STUDYING TEACHING**

Kara Jones **Jackson*** (1), Paul **Cobb** (2), Erin **Henrick** (2), Thomas **Smith** (3)  
(1: University of Washington; 2: Vanderbilt University; 3: University of California)  
**INVESTIGATING AND SUPPORTING INSTRUCTIONAL IMPROVEMENT AT SCALE**

Katherine **Roan***, Man Ching Esther **Chan**, Carmel **Mesiti**, David **Clarke**  
(University of Melbourne)  
**TEACHERS AS RESEARCH PARTNERS: THE CONTRIBUTION OF TEACHER EXPERTISE TO EDUCATIONAL RESEARCH**

Tomas **Højgaard***, Rune **Hansen**  
(Aarhus University)  
**DIDACTICAL MODELLING**

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**Location:** K: purple, Law Building, room 9  
**Group B – Session Chair: Christine **Knipping****

Presentations: Claudia **Corriveau*** (1), Nadine **Bednarz** (2)  
(1: Université Laval; 2: Université du Québec à Montréal)  
**COLLABORATIVE RESEARCH IN MATHEMATICS EDUCATION: APPROACHING QUESTIONS RELATED TO TEACHING PRACTICES**

Janice B. **Fournillier***, Christine **Thomas**, Draga **Vidakovic**, Pier Junor **Clarke**  
(Georgia State University)  
**METHODOLOGY AND EVALUATION RESEARCH: SECONDARY SCHOOL MATHEMATICS TEACHERS’ PERSPECTIVES ON PEDAGOGY AND PRACTICES**
Sergio Celis* (1), Vilma Mesa (2)
(1: Universidad de Chile; 2: University of Michigan)
METHODOLOGICAL ISSUES IN STUDYING PRACTICAL RATIONALITY IN THE CONTEXT OF COMMUNITY COLLEGE MATHEMATICS

Helena Grundén*
(Linnaeus University)
DIVERSITY IN MEANING AS AN ISSUE IN RESEARCH INTERVIEWS

**Third Session: Friday, 29 July 2016, 12.00–13.30**
**Location: K: purple, Law Building, room 1+2**
**Group A – Session Chair: Christine Knipping**

Presentations: Fady El Chidiac*
(University of California Berkeley)
A TECHNIQUE TO UNRAVEL ENTANGLED SUBJECT POSITIONS IN MATHEMATICS CLASSROOMS

Christine Knipping*, Jenny Cramer
(Universität Bremen)
METHODOLOGICAL ISSUES RELATED TO RECONSTRUCTING PARTICIPATION IN ARGUMENTATION

Maria Pavlova, Maria Shabanova*
(Northern (Arctic) Federal University named after M.V. Lomonosov)
THE EDUCATIONAL PROJECT “EXPERIMENTAL MATHEMATICS”

Abigail Fregni Lins* (1), Patricia Sandalo Pereira (2), Mercedes Carvalho (3)
(1: State University of Paraíba UEPB; 2: Federal University of Mato Grosso do Sul UFMS; 3: Federal University of Alagoas UFAL)
COLLABORATIVE RESEARCH WORK PROJECT WITH TEACHERS WHO TEACH MATHEMATICS AT SCHOOL LEVEL IN THE NORTH EAST AND CENTER EAST

**Location: K: purple, Law Building, room 9**
**Group B – Session Chair: David Clarke**

Presentations: Ann Cathrice George*, Alexander Robitzsch
(Institute for Educational Research)
DO INTERACTIONS MATTER IN THE END? A NEW PERSPECTIVE ON GENDER DIFFERENCES IN MATHEMATICAL SUB-COMPETENCIES

Tamar Apel Campo*
(CimeH Institute)
“LET’S TALK MATH”, DYNAMIC ASSESSMENT OF LEARNING PROCESSES IN MATHEMATICS METHODOLOGY

Alice Lemmo*
(University of Palermo)
THE PROCESS OF MIGRATION FROM PAPER-BASED TO COMPUTER-BASED TEST: HOW STUDENTS APPROACH WITH MIGRATED TASK
Fourth Session: Saturday, 30 July 2016, 12.00–13.30
Location: K: purple, Law Building, room 1+2

Session Chairs: Alan Schoenfeld, David Clarke
FRAMING GENERAL DISCUSSION AND SHARING OF WORKING GROUP DISCUSSIONS

TSG 53 – Philosophy of mathematics education

Co-chairs: Paul Ernest (UK), Ladislav Kvasz (Czech Republic)
Team members: Maria Bicudo (Brazil), Regina Möller (Germany), Ole Skovsmose (Denmark/Brazil)

First Session: Tuesday, 26 July 2016, 12.00–13.30
Location: B: dark-brown, East Wing Building, room 120
Session Chairs: Ladislav Kvasz, Ole Skovsmose

Presentations: Paul Ernest*
(University of Exeter)
AN OVERVIEW OF THE PHILOSOPHY OF MATHEMATICS EDUCATION

Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: B: dark-brown, East Wing Building, room 120
Session Chairs: Paul Ernest, Ladislav Kvasz

Presentations: Ole Skovsmose*
(Aalborg University)
POLITICS OF MEANING IN MATHEMATICS EDUCATION: SHORT VERSION

Maria Bicudo*
(São Paulo State University – Brazil)
DEVELOPMENTS IN PHILOSOPHY IN/OF MATHEMATICAL EDUCATION: ONTOLOGICAL QUESTIONS POSED BY THE PRESENCE OF COMPUTERS AND OT

Third Session: Friday, 29 July 2016, 12.00–13.30
Location: B: dark-brown, East Wing Building, room 120
Group A – Session Chair: Paul Ernest

Presentations: Jeff Evans* (1), Keiko Yasukawa (2)
(1: Middlesex University; 2: University of Technology Sydney)
RESEARCHERS AS POLICY ACTORS? EXAMINING THE INTERACTION BETWEEN MATHEMATICS EDUCATION RESEARCH AND PIAAC
Iskra Nunez*
(The University of Nebraska-Kearney)
THEORETICAL INCOMPLETENESS AND MATHEMATICS EDUCATION

Nadia Stoyanova Kennedy*
(Nadia Stoyanova Kennedy)
OPENING A PHILOSOPHICAL SPACE IN THE MATHEMATICS CURRICULUM

Cintia Aparecida Bento Santos* (1), Fernanda Aparecida Ferreira (2)
(1: UNICSUL/SP; 2: CEFET/MG)
POSSIBILITIES OF THE PHENOMENOLOGICAL APPROACH AND OF PHILOSOPHICAL
HERMENEUTICS IN TYPE SEARCH STATE OF ART

Location: B: dark-brown, East Wing Building, room 124
Group B – Session Chair: Ladislav Kvasz

Presentations: Jörn Schnieder* (1), Ingrid Scharlau (2)
(1: Universität zu Lübeck; 2: Universität Paderborn)
READING MATHEMATICAL TEXTS WITH PHILOSOPHICAL METHODS

Uwe Schürmann*
(Westfälische Wilhelms-Universität Münster)
THE ORDER OF THE DISCOURSE ON MODELLING

Michael Meyer*
(University of Cologne)
CONCEPT FORMATION AS A RULE-BASED USE OF WORDS

Filipe Santos Fernandes*
(Federal University of Minas Gerais)
HISTORY OF SCIENTIFIC AND ACADEMIC PRODUCTION IN MATHEMATICS EDUCATION:
REPRESENTATION, INSTITUTION AND POLICY

Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30
Location: B: dark-brown, East Wing Building, room 120
Session Chairs: Paul Ernest, Maria Bicudo

Presentations: Ladislav Kvasz*
(Charles University Prague)
LANGUAGE OF MATHEMATICS IN A HISTORICAL, EPISTEMOLOGICAL,
AND EDUCATIONAL PERSPECTIVE

Regina Möller*
(University of Erfurt)
THE TEACHING OF VELOCITY IN MATHEMATICS CLASSES –
CHANCES FOR PHILOSOPHICAL IDEAS
TSG 54 – Semiotics in mathematics education

Co-chairs: Norma Presmeg (USA), Luis Radford (Canada)
Team members: Gert Kadunz (Austria), Luis Puig (Spain), Wolff-Michael Roth (Canada)

First Session: Tuesday, 26 July 2016, 12.00 – 13.30
Location: B: dark-brown, East Wing Building, room 121
Session Chairs: Wolff-Michael Roth, Jacinto Eloy Puig Portal

Presentations: Luis Radford* (Laurentian University)
THE ETHIC OF SEMIOSIS AND THE CLASSROOM CONSTITUTION OF MATHEMATICAL SUBJECTS

Adalira Sáenz-Ludlow* (University of North Carolina)
GEOMETRY EXAMPLES OF DIAGRAMMATIC REASONING

Gert Kadunz* (University of Klagenfurt)
A MATTER OF TRANSLATION

Second Session: Wednesday, 27 July 2016, 12.00 – 13.30
Location: B: dark-brown, East Wing Building, room 121
Session Chair: Luis Radford, Wolff-Michael Roth

Presentations: Wolff-Michael Roth* (University of Victoria)
BIRTH OF SIGNS: FROM TRIANGULAR SEMIOTICS TO COMMUNICA-TIVE FIELDS

Candia Morgan* (UCL Institute of Education)
USING SOCIAL SEMIOTICS TO EXPLORE INSTITUTIONAL ASSUMPTIONS ABOUT MATHEMATICS, STUDENTS AND TEACHERS

Michael Otte* (Universität Bielefeld)
SEMIOTICS, EPISTEMOLOGY AND MATHEMATICAL GENERALIZATION

Third Session: Friday, 29 July 2016, 12.00 – 13.30
Location: B: dark-brown, East Wing Building, room 121
Group A – Session Chair: Wolff-Michael Roth

Presentations: Ulises Alfonso Salinas* (1), José Guzmán (1), Isaias Miranda (2)
(1: Center of Research and Advanced Studies IPN; 2: IPN-CICATA)
ARTIFACT MEDIATION IN THE PROCESS OF OBJECTIFICATION

Osama Swidan*, Naomi Prusak, Baruch Schwarz (Hebrew University of Jerusalem)
OBJECTIFYING THE HIERARCHICAL CLASSIFICATION OF QUADRILATERALS IN A SYNCHRONIC – INTERACTIVE AND COLLABORATIVE COMPUTER
Debbie Stott*
(Rhodes University)
GESTURING: A KEY ASPECT OF MEDIATION FOR YOUNG LEARNERS IN A SOUTH AFRICAN CONTEXT?

Alexander Salle (1), Christina M. Krause* (2)
(1: Osnabrück University (Germany); 2: University of Duisburg-Essen)
ON THE ROLE OF GESTURES FOR THE DESCRIPTIVE ANALYSIS OF ‘GRUNDVORSTELLUNGEN’: A CASE OF LINEAR FUNCTIONS

**Location:** B: dark-brown, East Wing Building, room 122
**Group B** – Session Chair: Gert Kadunz

Presentations: Corin Dessan Mathews* (Wits)
DIVISION MEANS LESS: CHAINS OF SIGNIFICATION IN A SOUTH AFRICAN CLASSROOM

Nejla Gürefe*, Ahmet Arıkan (Ahi Evran University)
ANALYSIS OF SEMIOTIC RESOURCES USED IN PROCESS OF HEARING-IMPAIRED STUDENTS’ TRIANGLE CONCEPT EXPLANATION

Barbara M. Kinach* (Arizona State University)
DIGITAL VISUALIZATION TASKS FOR MATHEMATICS TEACHER DEVELOPMENT: A SEMIOTIC CHAINING ANALYSIS

Édith Petitfour*
(LDAR)
TEACHING GEOMETRY TO VISUAL-SPATIAL DYSPRAXIC PUPILS

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**Fourth Session: Saturday, 30 July 2016, 12.00 – 13.30**
**Location:** B: dark-brown, East Wing Building, room 121
Session Chairs: Luis Radford, Norma Presmeg

Presentations: Yasmine Abtahi*
(University of Ottawa)
SEMIOTIC: SIGNS, TOOLS, AND MEANING-MAKING

Petra Margarete Menz*, Nathalie Sinclair (Simon Fraser University)
DIAGRAMMING AND GESTURING DURING MATHEMATIZING

José Francisco Gutiérrez*
(University of Wisconsin)
EXPLORING TENSIONS IN THE “OBJ–SUBJ” DIALECTIC
Oral Communications

**TSG 1 – Early childhood mathematics education (up to age 7)**

Co-chairs: Elia **Iliada** (Cyprus), Joanne Mulligan (Australia)
Team members: Ann Anderson (Canada), Anna Baccaglini Frank (Italy), Christiane Benz (Germany)

**First Session: Tuesday, 26 July 2016, 15.00–16.00**
**Location: G: green, Social Science Building, room A411**

Session Chairs: Iliada Elia, Anna Ethelwyn Baccaglini-Frank
Presentations: Jean-Luc Dorier*, Sylvia Coutat (University of Geneva)
CONCEPTUALIZING ORDER IN EARLY SCHOOL

Reinert Andre Rinvold* (Hedmark University College)
THE DIFFICULTY OF LEARNING THE FIRST THREE NUMEROSITIES

Kehinde Emmanuel Adenegan*
(Adeyemi College of Education)
AN INVESTIGATION INTO THE WRITING AND COMPUTATIONAL SKILLS OF SCHOOL PUPILS OF AGE 3–6: IMPLICATIONS FOR EARLY CHILDHOOD

Elizabeth Henning* (1), Roelien Herholdt (2), Lara Ragpot (1), Lars Balzer (3), Antje Ehlert (4), Annemarie Fritz-Stratmann (5)
(1: University of Johannesburg; 2: JET Education Services; 3: Swiss Federal Institute for Vocational Education and Training; 4: University of Potsdam; 5: University of Duisburg-Essen)
TRANSLATING AND STANDARDISING A GERMAN ARITHMETICAL COMPETENCE TEST IN FOUR SOUTH AFRICAN LANGUAGES

**Second Session: Tuesday, 26 July 2016, 16.30–18.00**
**Location: G: green, Social Science Building, room A411**

Session Chairs: Iliada Elia, Anna Ethelwyn Baccaglini-Frank
Presentations: Simone Damm Zogaib*, Thiarla Xavier Dal-Cin Zanon, José Carlos Thompson da Silva (Universidade Federal do Espírito Santo)
A SURVEY ON SPATIAL SENSE IN CHILDHOOD EDUCATION

Satoshi Watanabe*
(Jissen Women’s University)
RESEARCH ON THE STRATEGY USE OF YOUNG CHILDREN CONSTRUCTING A CUBE FROM FLAT PLANE SQUARES

Nicole Fletcher* (1), Herbert Ginsburg (2)
(1: Temple University; 2: Teachers College)
TEACHING SYMMETRY IN THE EARLY CHILDHOOD CLASSROOM: USING SOFTWARE TO PROMOTE UNDERSTANDING OF SYMMETRIC TRANSFORMATIONS

Elif Karsli*
(TED University)
YOUNG CHILDREN’S EMBODIED MATHEMATICAL PRACTICES IN A PRE-K CLASSROOM
Dorota Lembrér*, Maria C. Johansson
(Malmö University)
SWEDISH PRESCHOOL TEACHERS’ VIEWS OF CHILDREN’S SOCIALISATION

Fourth Session: Friday, 29 July 2016, 16.30 – 18.00
Location: G: green, Social Science Building, room A411

Session Chairs: Joanne Mulligan, Christiane Benz
Presentations: Audrey Cooke*
(Curtin University)
PRE-SERVICE TEACHER RELATIONSHIPS WITH MATHEMATICS – CREATIVE? ANXIOUS? COMPETENT?

Julia Bruns* (1), Lars Eichen (1), Sigrid Blömeke (2)
(1: Humboldt-Universität zu Berlin; 2: Centre for Educational Measurement)
PRE-SCHOOL TEACHERS’ MATHEMATICS-RELATED COMPETENCIES

Lars Jenßen* (1), Katja Eilerts (2), Thomas Koinzer (2), Corinna Schmude (3), Sigrid Blömeke (4)
(1: Freie Universität Berlin; 2: Humboldt Universität zu Berlin; 3: Alice Salomon Hochschule Berlin; 4: University of Oslo)
DEVELOPMENT AND VALIDATION OF A TEST BATTERY ASSESSING PRESCHOOL TEACHERS’ PROFESSIONAL COMPETENCE IN THE FIELD OF MATHE

Trude Fosse*, Magni Hope Lossius
(Bergen University College)
NORWEGIAN KINDERGARTEN TEACHER WORK WITH MATHEMATICS

Annemarie Fritz-Stratmann* (1,3), Moritz Herzog (1), Antje Ehlert (2,3)
(1: University of Duisburg-Essen; 2: University of Potsdam; 3: University of Jahnsburg)
FROM THOUGHT TO REALITY – IMPLEMENTATION OF AN IN-SCHOOL MATHEMATICS TRAINING IN SOUTH AFRICA

Dina Hassidov* (1), Bat-Sheva Ilany (2)
(1: western galil College; 2: Beit-Berl College)
“SENSO-MATH” PRESCHOOL PROGRAM FACILITATORS CONTRIBUTE TO MATHEMATICS EDUCATION IN THE PRESCHOOL

TSG 2 – Mathematics education at tertiary level

Co-chairs: Victor Giraldo (Brazil), Chris Rasmussen (USA)
Team members: Irene Biza (UK), Reinhard Hochmuth (Germany), Azimeh Khakbaz (Iran)

First Session: Tuesday, 26 July 2016, 15.00 – 16.00
Location: K: purple, Law Building, room 9

Group A – Session Chair: Chris Rasmussen
Presentations: Evangelia Triantafyllou*, Olga Timcenko
(Aalborg University Copenhagen)
DIFFICULTIES IN MATHEMATICS EXPERIENCED BY STUDENTS IN A TRANS-DISCIPLINARY ENGINEERING STUDY
Ryuichi Mizumachi*  
(Shonan Institute of Technology)  
IDEAS OF MATHEMATICAL LITERACY FOR CULTIVATING STUDENTS’ UNDERSTANDING OF CONCEPTS OF LINEAR ALGEBRA

María José Beltrán-Meneu* (1), Marina Murillo-Arcila (2)  
(1: Universitat de València; 2: Universitat Politècnica de València)  
A TASK DESIGN TO INTRODUCE THE CONCEPTS OF EIGENVECTORS AND EIGENVALUES – AN EMBODIED APPROACH

Robyn Pierce, Caroline Bardini*  
(The University of Melbourne)  
DÉJÀ VU IN MATHEMATICS: WHAT DOES IT LOOK LIKE?

Location: K: purple, Law Building, room 7

Group B – Session Chair: Irene Biza  
Presentations: Anne D’Arcy-Warmington*  
(Curtin University)  
THE ART OF MATHEMATICAL CHATTER

Seyed Hadi Afzali Borujeni*, Azimehsadat Khakbaz  
(IPM)  
WHY STUDENTS ARE NOT MOTIVATED TO LEARN MATHEMATICS?

Andrew Francis Hare*  
(Simon Fraser University)  
"WHAT WE NEED TO SHOW IS THAT T IS WELL-DEFINED": GESTURE AND DIAGRAM IN ABSTRACT ALGEBRA

Juliane Püschl*  
(University of Paderborn)  
SCRIPTS IN MATHEMATICS TUTORIALS

Second Session: Tuesday, 26 July 2016, 16.30 – 18.00  
Location: K: purple, Law Building, room 9

Group A – Session Chair: Chris Rasmussen  
Presentations: Aaron D. Wangberg* (1), Brian Fisher (2), Elizabeth Gire (3), Jason Samuels (4)  
(1: Winona State University; 2: Lubbock Christian University; 3: Oregon State University; 4: City University of New York – BMCC)  
A CASE STUDY ON THE IMPACT OF INVESTIGATING MULTIVARIABLE CALCULUS CONCEPTS THROUGH GEOMETRY AND MULTIPLE REPRESENTATION

Caroline Julia Merighi*  
(Tufts University)  
STUDENT REASONING ABOUT FUNCTIONS, LIMITS, AND RATE OF CHANGE IN INTRODUCTORY CALCULUS

Jianren Niu*, Liang Yang  
(Sichuan University)  
RESEARCH AND PRACTICE OF COLLEGE MATHEMATICS COURSE ASSESSMENT IN SICHUAN UNIVERSITY
Frank Feudel*  
(University of Paderborn)  
HOW DO STUDENTS OF ECONOMICS UNDERSTAND THE CONCEPT OF MARGINAL COST?

Younes Karimi Fardinpour*  
(IAU)  
ABOUT DOING GEOMETRIC APPROACH IN DIFFERENTIAL EQUATIONS: DIFFICULTIES AND A COHERENT METHOD

Fereshteh Zeynivandnezhad*  
(Organization for Educational and Research Planning)  
INSTRUMENTAL ACTION SCHEMES IN DIFFERENTIAL EQUATIONS USING A COMPUTER ALGEBRA SYSTEM, MAXIMA

Location: K: purple, Law Building, room 7

Group B – Session Chair: Irene Biza  
Presentations: Chen Li*, Chen Chaodong  
(Sichuan University)  
THE PRACTICE, GUARANTEE AND EFFECT ON THE SECOND CLASSROOM PLATFORM IN UNIVERSITY MATHEMATICS TEACHING

Chao dong Chen*, Jian ren Niu  
(Sichuan University)  
A COMPARATIVE STUDY OF UNIVERSITY STUDENTS’ MATH ACHIEVEMENT OF SMALL-CLASS TEACHING AND LARGE-CLASS TEACHING

Christina M. Starkey*, Hiroko Warshauer, Max Warshauer  
(Texas State University)  
USING JOURNALS TO SUPPORT LEARNING: CASE OF NUMBER THEORY AND PROOF

Geraldo Claudio Broetto (1), Vânia Maria Santos-Wagner* (2)  
(1: Instituto Federal do Espírito Santo; 2: Universidade Federal do Espírito Santo)  
KNOWLEDGE OF RATIONAL AND IRRATIONAL NUMBERS OF TWO UNDERGRADUATE STUDENTS

Elena G. Yevsyeyeva*  
(Donetsk National University)  
THE ACTIVITY-BASED LEARNING OF MATHEMATICS IN A TECHNICAL HIGHER EDUCATION INSTITUTION

Azimehsadat Khakbaz*, Seyed Hadi Afzali Borujeni  
(Bu Ali Sina University)  
MOTIVATING UNIVERSITY STUDENTS TO LEARN MATHEMATICS

Third Session: Friday, 29 July 2016, 15.00 – 16.00  
Location: K: purple, Law Building, room 9

Group A – Session Chair: Victor Giraldo  
Presentations: Jéssica de Aguiar França*, Regina da Silva Pina-Neves, Raquel Carneiro Dörr  
(Universidade de Brasilia)  
THE FUTURE OF MATHEMATICS TEACHING: ANALYSIS OF THE EXPECTATIONS OF UNDERGRADUATES IN THE FEDERAL DISTRICT, BRAZIL
Ben Davies*, Caroline Yoon, John Griffith Moala, Wes Maciejewski
(The University of Auckland)
PRINCIPLES FOR DESIGNING INVENTION TASKS FOR UNDERGRADUATE MATHEMATICS

Mitsuru Kawazoe*, Masahiko Okamoto
(Osaka Prefecture University)
MEANINGFUL LEARNING IN MATHEMATICS EDUCATION FOR THE HUMANITIES AND SOCIAL SCIENCES STUDENTS

Ignasi Florensa* (1), Marianna Bosch (2), Josep Gascón (3)
(1: EUSS; 2: IQS School of Management; 3: Univ. Autònoma de Barcelona)
LECTURER EDUCATION: A COURSE DESIGN

Location: K: purple, Law Building, room 7

Group B – Session Chair: Azimehsadat Khakbaz
Presentations: Weng Kin Ho* (1), Kok Ming Teo (1), Lu Pien Cheng (1), Puay San Chan (2)
(1: Nanyang Technological University; 2: Innova Junior College)
AN INVESTIGATION INTO THE EFFICACY OF FLIPPED CLASSROOM FOR TERTIARY MATHEMATICS

Haitham S. Solh*
(American University in Dubai)
INTERACTIVE VIDEOS: A 21ST CENTURY NECESSITY FOR STUDENT ENGAGEMENT

Chantal Buteau*, Eric Muller
(Brock University)
SYSTEMIC INTEGRATION OF PROGRAMMING IN UNDERGRADUATE MATHEMATICS: FROM IMPLEMENTATION TO THEORY

Laura Rose Margaret Broley*
(Concordia University)
UNDERGRADUATE MATH STUDENTS’ INTERACTIONS WITH PROGRAMMING: DEVELOPING INSTRUMENTS IN INSTITUTIONS

Fourth Session: Friday, 29 July 2016, 16.30–18.00
Location: K: purple, Law Building, room 9

Group A – Session Chair: Victor Giraldo
Presentations: Christoph Neugebauer* (1), Sebastian Krusekamp (1), Kathrin Winter (2)
(1: University of Münster; 2: University of Flensburg)
DEVELOPMENT OF DIAGNOSTIC SELF-ASSESSMENTS AS A BASE FOR INDIVIDUAL SUPPORT FOR FIRST-YEAR STUDENTS

Tobias Mai*, Silvia Becher
(University of Paderborn)
DIDACTICAL ELABORATION OF MULTIMEDIA LEARNING MATERIALS BY RECENT TECHNOLOGICAL ADVANCEMENTS EXEMPLIFIED BY COMPUTER AID

Yoshitaka Nakakoji*, Rachel Wilson
(The University of Sydney)
EXPLORATION OF TRANSFER OF FIRST YEAR UNDERGRADUATE MATHEMATICAL LEARNING TO SCIENCE
William Crombie*  
(The Algebra Project)
THE ALGEBRA-TO-CALCULUS TRANSITION

Robin Göller*  
(Universität Kassel)
WHAT FIRST YEAR UNIVERSITY STUDENTS’ RECOMMENDATIONS FOR FRESHMEN REVEAL ABOUT THEIR LEARNING STRATEGIES

Michael Surman Jennings*, Merrilyn Goos, Peter Adams  
(The University of Queensland)
ISSUES IN THE TRANSITION FROM SECONDARY TO TERTIARY MATHEMATICS

Location: K: purple, Law Building, room 7

Group B – Session Chair: Reinhard Hochmuth
Presentations: Frode Ronning*  
(Norwegian University of Science and Technology)
CHALLENGES INVOLVED WHEN REFORMING TRADITIONAL COURSES IN MATHEMATICS FOR ENGINEERS

Joerg Kortemeyer*, Rolf Biehler  
(University of Paderborn)
ANALYSIS OF TYPICAL MATHEMATICAL COMPETENCES REQUIRED TO SOLVE TASKS IN BASIC ENGINEERING COURSES

Robert Ivo Mei*  
(RWTH Aachen University)
TREE-STRUCTURED ONLINE EXERCISES IN MATHEMATICS FOR ENGINEERING STUDENTS: DESIGN AND EVALUATION

Birgit Griese*, Michael Kallweit  
(Ruhr-Universität Bochum)
LEARNING BEHAVIOUR, ACADEMIC SUCCESS IN ENGINEERING MATHEMATICS, AND LECTURERS’ RATINGS

Ronja Kürten*  
(Westfälische Wilhelms-Universität Münster)
MATHEMATICAL SELF-EFFICACY OF ENGINEERING STUDENTS AT THE INTRODUCTORY PHASE OF STUDIES

Birgit Loch*, Wendy Scott, Michelle Dunn  
(Swinburne University of Technology)
A PRELIMINARY ANALYSIS OF THE EFFECTIVENESS OF STUDENT-PRODUCED VIDEOS ON THE RELEVANCE OF MATHEMATICS IN ENGINEERING
TSG 3 – Mathematics education in and for work

Co-chairs: Geoff Wake (UK), Diana Coben (New Zealand)
Team members: Burkhard Alpers (Germany), Keith Weeks (UK), Peter Frejd (Sweden)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: E: mint, Economical Building, room 2053

Session Chair: Keith Weeks
Presentations: Bozena Maj-Tatsis* (1), Konstantinos Tatsis (2)
(1: University of Rzeszow; 2: University of Ioannina)
CONSTRUCTING MATHEMATICAL PROBLEMS FOR ADVANCED MANUFACTURING WORKERS

Pamela Vale*
(Rhodes University)
DEVELOPING THE ABILITY TO USE MEASUREMENT CONCEPTS AND SKILLS IN AND FOR WORK: THE VALUE OF COLLABORATIVE TASKS

Linda Galligan*
(University of Southern Queensland)
NURSING NUMERACY AND PROPORTIONAL REASONING

Jesús Omar Aldape Carrillo*, Avenilde Romo Vázquez
(IPN / CICATA)
A STUDY OF THE ROLE OF MATHEMATICS IN METROLOGY, THE CASE OF AN AUTOMOBILE COMPANY

Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: E: mint, Economical Building, room 2053

Session Chair: Peter Frejd
Presentations: Catherine Byrne*, Michael Carr, Brian Bowe
(Dublin Institute of Technology)
ASSESSMENT AND ENGAGEMENT IN MATHS IN PRISON EDUCATION

Trude Sundtjønn*
(Oslo and Akershus University College of Applied Sciences)
STUDENTS’ TREATMENT OF AUTHENTICITY IN VOCATIONAL CONNECTED TASKS

Uwe Schallmaier*, Maike Vollstedt, Duchhardt Christoph
(Universität Bremen)
MATHEMATICAL COMPETENCES, REQUIREMENTS AND JOB SATISFACTION

Third Session: Friday, 29 July 2016, 15.00–16.00
Location: E: mint, Economical Building, room 2053

Group A – Session Chair: Diana Cicely Coben
Presentations: Karolina Muhrman*
(Linköping University)
WHY SHOULD VOCATIONAL EDUCATION STUDENTS LEARN MATHEMATICS?
A WORKING LIFE PERSPECTIVE.
Christoph Duchhardt*, Maike Vollstedt
(University of Bremen)
USE OF MATHEMATICS AT WORK: THE CRUX OF SELF-REPORTS

Diane Dalby*
(University of Nottingham)
VOCATIONAL STUDENTS AND MATHEMATICS IN THE TRANSITION TO WORK

TSG 4 – Activities for, and research on, mathematically gifted students

Co-chairs: Florence Mihaela Singer (Romania), Linda Sheffield (USA)
Team members: Matthias Brandl (Germany), Viktor Freiman (Canada), Kyoko Kakhana (Japan)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: E: mint, Economical Building, room 2067/71

Session Chairs: Linda Sheffield, Matthias Brandl
Presentations: Jack Mathoga Marumo*
(Central University of Technology)
ENRICHMENT FOR MATHEMATICALLY GIFTED LEARNERS

Benjamin Rott* (1), Maike Schindler (2)
(1: University of Duisburg-Essen; 2: Örebro University)
SORTING EXISTING THEORIES IN THE FIELD OF MATHEMATICAL GIFTEDNESS
ALONG TWO DIMENSIONS

Ralf Benölken* (1), Elisabet Mellroth (2)
(1: University of Münster; 2: Karlstad University)
MATHEMATICAL PROMISE AND FREQUENT CHARACTERISTICS OF MOTIVATIONAL
FACTORS WITH SWEDISH GIRLS AND BOYS

Yanyun Liu*
(Malvern College Qingdao)
THE RESEARCH OF CHINESE HIGH SCHOOL STUDENTS’ EFFICIENT
LEARNING MATHEMATICS

Third Session: Friday, 29 July 2016, 15.00–16.00
Location: E: mint, Economical Building, room 2067/71

Session Chairs: Florence Mihaela Singer, Viktor Freiman
Presentations: Stefanie Winkler*, Matthias Brandl
(University of Passau)
EMPIRICAL ANALYSIS OF MATHEMATICAL SKILLS AN POTENTIAL
GIFTEDNESS AT PRIMARY SCHOOL

Liyu Zhang*
(East China Normal University)
SOME FEATURES OF SOLVING PROBLEMS OF GIFTED STUDENTS
Valentina Gogovska*
(Faculty of Natural Sciences and Mathematics)
TASKS IN MATHEMATICS TEACHING AS AN OPPORTUNITY FOR FORMING MATHEMATICAL SKILLS FOR GIFTED STUDENT

TSG 5 – Activities for, and research on, students with special needs
Co-chairs: Lourdes Figueiras (Spain), Rose Griffiths (UK)
Team members: Karen Karp (USA), Jens Holger Lorenz (Germany), Miriam Godoy Penteado (Brazil)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: I: blue, Philosophical Tower, lecture hall E

Group A – Session Chairs: Karen Karp, Rose Griffiths
Presentations: Eugenie Kestel*, Helen Forgasz
(Monash University)
AN INVESTIGATION OF A TARGETED TUITION PROGRAM FOR STUDENTS WITH MATHEMATICAL LEARNING DIFFICULTIES

Di Liu*, Jianpan Wang
(East China Normal University)
MATHPROBLEM REPRESENTATION AND PROBLEM SOLVING OF 4TH GRADE CHINESE STUDENTS WITH MATHEMATICS LEARNING DISABILITIES

Céline Vendeira Maréchal*
(Université of Geneva)
THE RICHARD’S CASE OR “HOW TO OUTSMART ONE’S DIFFICULTIES”

Location: E: mint, Economical Building, room 4045/46

Group B – Session Chairs: Lourdes Figueiras, Miriam Godoy Penteado
Presentations: Michelle Stephan* (1), Akyuz Didem (2), Smith Jennifer (3)
(1: UNC Charlotte; 2: Middle East Technical University; 3: Seminole County Public Schools)
DIRECT OR INQUIRY INSTRUCTION FOR STUDENTS WITH SPECIAL NEEDS?
THE WRONG QUESTION

Sweeling Leong* (1), Walker Zachary (2), Lee Nganhoe (2)
(1: Dunman High School; 2: National Institute of Education)
EFFECTS OF A MATHEMATICS INSTRUCTIONAL SEQUENCE ON THE CONCEPTUAL AND PROCEDURAL UNDERSTANDING OF ALGEBRIAC EXPRESSIONS

Natascha Korff*
(University of Bremen)
HOW INCLUSIVE CLASSROOMS CAN IMPROVE THE QUALITY OF MATHEMATICS TEACHING

Laurent Theis* (1), Teresa Assude (2), Jeanne Koudogbo (1), Karine Millon-Fauré (2), Marie-Pier Morin (1), Jeanette Tambone (2)
(1: Université de Sherbrooke; 2: Université d’Aix-Marseille)
ANALYSIS OF AN AID SESSION FOR INTEGRATED AT-RISK STUDENTS DURING MATHEMATICAL PROBLEM-SOLVING
Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: E: mint, Economical Building, room 4045/46

Session Chairs: Karen Karp, Rose Griffiths
Presentations: John Woodward*
(University of Puget Sound)
CHALLENGE OF PROPORTIONAL THINKING FOR STUDENTS WITH MATH DISABILITIES
Katherine Elizabeth Lewis*
(University of Washington)
PARTITIONING AS THE GENERATIVE ROOTS OF FRACTION UNDERSTANDING:
A CASE STUDY OF A MATH LEARNING DISABILITY
Xenia Lamprecht*
(University of Bamberg)
DESIGNING AND EVALUATING A SUPPORT-CONCEPT ON MULTIPLICATIVE
UNDERSTANDING
Yılmaz Mutlu* (1), Levent Akgün (2)
(1: Middle Alparslan University; 2: Atatürk University)
HOW DO COMPUTER AIDED INSTRUCTION MATERIALS INFLUENCE THE
APPROXIMATE NUMBER SYSTEM OF CHILDREN WITH MATHEMATICS LEARNING
Arla Westenskow* (1), Patricia Moyer-Packenham (1), Barbara Child (2)
(1: Utah State University; 2: Logan City School District)
USING AN ICEBERG MODEL TO TARGET STUDENTS’ DIFFICULTIES IN PLACE
VALUE UNDERSTANDINGS

Third Session: Friday, 29 July 2016, 15.00–16.00
Location: I: blue, Philosophical Tower, lecture hall E

Group A – Session Chair: Rose Griffiths
Presentations: Elena Gil* (1), Ana María Millán Gasca (2)
(1: University of Zaragoza; 2: Università degli studi Roma Tre)
INTEGRATED ARITHMETIC AND GEOMETRY FOR DOWN SYNDROME CHILDREN
Steffen Siegemund*
(Universität Hamburg)
COGNITIVE LEARNING PREREQUISITES AND TEACHING MATHEMATICAL
SKILLS TO STUDENTS WITH MODERATE INTELLECTUAL DISABILITY
Robyn Ruttenberg-Rozen*
(York University)
LEVERAGING STRENGTHS: THE USE OF WONDER IN MATHEMATICS
AS AN INTERVENTION FOR A CHILD DIAGNOSED WITH ADHD

Location: E: mint, Economical Building, room 4045/46

Group B – Session Chairs: Lourdes Figueiras, Miriam Godoy Penteados
Presentations: Elena Alexandrovna Sedova*, Sergey Alexeevich Sedov
(ISRO RAO)
LIMITS OF AVAILABILITY AND APPLICABILITY OF DIFFERENT ASPECTS
OF THE SCHOOL MATHEMATICAL EDUCATION
Edel Mary Reilly*, (1), Kelly George (2)
(1: Indiana University of Pennsylvania; 2: Indiana Area Junior High School)
BUILDING DREAMS: HELPING STUDENTS WITH MATHEMATICAL LEARNING DIFFICULTIES ACHIEVE SUCCESS

Sarah van Ingen*, Samuel Eskelson, David Allsopp
(University of South Florida)
PREPARING PROSPECTIVE TEACHERS TO ENGAGE IN MATHEMATICS CONSULTATIONS

Julie Alderton* (1), Sue Gifford (2)
(1: University of Cambridge; 2: University of Roehampton)
TEACHING CHILDREN WITH MATHEMATICS DIFFICULTIES: A PEDAGOGY OF DESENSITIVITY

Fourth Session: Friday, 29 July 2016, 16.30–18.00
Location: E: mint, Economical Building, room 4045/46

Session Chairs: Lourdes Figueiras, Miriam Godoy Penteado
Presentations: Amanda Queiroz Moura*, Miriam Godoy Penteado
(Universidade Estadual Paulista – Unesp)
DEAF CHILDREN IN A LANDSCAPE OF MATHEMATICS INVESTIGATION

Elizabeth Becerra Ramos*, Ricardo Quintero Zazueta
(Cinvestav-IPN)
CONDITIONAL EXPRESSIONS IN THE MEXICAN SIGN LANGUAGE

Annemiek Van Leendert* (1), Michiel Doorman (2), Paul Drijvers (2), Johan Pel (3), Hans Van Der Steen (3)
(1: Royal Visio; 2: Utrecht University; 3: Erasmus University Medical Center)
READING AND COMPREHENDING ALGEBRAIC EXPRESSIONS BY SIGHTED AND BRAILLE-DEPENDENT STUDENTS

Christopher Adam Noel Kurz*, Kim Lorraine Kurz
(Rochester Institute of Technology)
MATHEMATICAL LITERACY CITIZENSHIP: DEAF AND HARD-OF-HEARING EXPERIENCE

TSG 7 – Popularization of mathematics

Co-chairs: Christian Mercat (France), Patrick Vennebush (USA)
Team members: Chris Budd (UK), Carlota Simões (Portugal), Jens Struckmeier (Germany)

First Session: Tuesday, 26 July 2016, 15.00 – 16.00
Location: E: mint, Economical Building, lecture hall A

Session Chair: Patrick Vennebush
Presentations: Fabrice Planchon (1), Nils Berglund* (2)
(1: Université de Nice; 2: Université d’Orléans)
IMAGES DES MATHEMATIQUES, A WEBSITE DEDICATED TO CURRENT RESEARCH TOPICS FOR THE GENERAL PUBLIC
Jean-François Nicaud* (1), Jana Trgalova (2), Nataly Essonnier (2), Christophe Viudez (1)
(1: Aristod; 2: S2HEP laboratory)

TETRISQUIZ: GAMES FOR LEARNING MATHEMATICS

Andreas M. Hinz* (LMU Munich)
PUZZLES AND GRAPHS

Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: E: mint, Economical Building, lecture hall A

Session Chair: Chris Budd
Presentations: Tin Lam Toh*, Lu Pien Cheng, Heng Jiang, Kam Ming Lim
(National Institute of Education singapore)

USE OF COMIC STORYTELLING IN TEACHING MATHEMATICS

Duduzile Mkhize* (University of Johannesburg)
TAPPING INTO ADOLESCENTS’ MAIN CHARACTERISTICS TO IGNITE MATHEMATICS INTEREST

TSG 8 – Teaching and learning of arithmetic and number systems (focus on primary education)

Co-chairs: Pi-Jen Lin (Chinese Taipei), Terezinha Nunes (UK)
Team members: Shuhua An (USA), Beatriz Vargas Dorneles (Brazil), Elisabeth Rathgeb-Schnierer (Germany)

First Session: Tuesday, 26 July 2016, 15.00 – 16.00
Location: H: orange, Educational Building, room 106

Group A – Session Chair: Terezinha Nunes
Presentations: Johanna Heitzer*
(RWTH Aachen)

PUNCH CARDS FOR PRIME FACTORIZATION – A VERSATILE MANIPULATIVE FOR DEMONSTRATION AND INDIVIDUAL USE

Mun Yee Lai* (Flinders University)
CHINESE HONG KONG GRADE FOUR STUDENTS’ KNOWLEDGE OF DECIMAL NOTATION AND QUANTITIES

Herman Makabeteng Tshesane* (University of the Witwatersrand)
GRADE 4 SOUTH AFRICAN LEARNERS AND SUBTRACTION

Swetlana Nordheimer*, Ana Dönevska-Todorova, André Henning (Humboldt University)
IS THERE A LARGEST NUMBER OF ALL? PUPILS’ REFLECTIONS ON NATURAL NUMBERS
**Location:** H: orange, Educational Building, room 209

**Group B** – Session Chair: Beatriz Vargas Dorneles
Presentations: Lurdes Serrazina*, Margarida Rodrigues (Instituto Politécnico de Lisboa)

‘DAY NUMBER’: A PROMOTER ROUTINE OF FLEXIBILITY AND CONCEPTUAL UNDERSTANDING

Renata Carvalho*
(Instituto de Educação)
MENTAL COMPUTATION WITH RATIONAL NUMBERS: STUDENTS MENTAL REPRESENTATIONS

Nicole Marie Wessman-Enzinger*
(George Fox University)
CHILDREN’S VISUAL MEDIATORS FOR INTEGER ADDITION AND SUBTRACTION OPEN NUMBER SENTENCES

Weimin Ji*
(East China Normal University)
CHILDREN’S UNDERSTANDING OF SUBTRACTION WITH REGROUPING

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**Second Session: Tuesday, 26 July 2016, 16.30–18.00**

**Location:** H: orange, Educational Building, room 106

**Group A** – Session Chair: Lieven Verschaffel
Presentations: Selahattin Arslan* (1), Oben Karahan (2)
(1: Karadeniz Technical University; 2: Erzincan University)

EPISTEMOLOGICAL OBSTACLES: THE CASE OF NEGATIVE NUMBER

Jin Chen* (1), Jing Cheng (2), Shuhua An (3), Weidong Wu (1)
(1: Zhejiang International Studies University; 2: East China Normal University; 3: California State University Long Beach)

COMPARATIVE STUDY ON THE COMPETENCY OF CLASSIFYING BETWEEN CHINESE AND U.S. STUDENTS OF THE FIRST GRADE

Su-Chiao Wu* (1), Yu-Liang Chang (1), Fou-Lai Lin (2)
(1: National Chiayi University; 2: National Taiwan Normal University)

INQUIRY-BASED MATHEMATICS ACTIVITY DESIGNING FOR CHILDREN

Candelaria González Polo* (1), José David Toro Vanegas (2)
(1: Red de Investigadores Educativos En México [REDIEEM]; 2: Universidad Sin Fronteras [USF])

CHALLENGES PRESENTED IN MATHEMATICAL PROBLEMS RESOLUTION

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**Location:** H: orange, Educational Building, room 209

**Group B** – Session Chair: Elisabeth Rathgeb-Schnierer
Presentations: Qinqiong Zhang*
(College of Teacher Education)

TEACHING OF FRACTION IN ELEMENTARY SCHOOL BASED ON UNDERSTANDING OF DIFFERENT SUB-CONSTRUCTS
Yu-Liang Chang* (1), Su-Chiao Wu (1), Jung-Kai Wang (2)
(1: National Chiayi University; 2: Kang-Ping Elementary School)
USING DIFFERENTIATED INSTRUCTION TO TEACH FIFTH-GRADERS FRACTIONS

Helena Gil Guerreiro* (1), Lurdes Serrazina (2)
(1: Instituto de Educação; 2: Escola Superior de Educação de Lisboa)
CONSTRUCTING RATIONAL NUMBERS’ UNDERSTANDINGS – A TEACHING EXPERIENCE AT PRIMARY SCHOOL

Sandra Gonçalves Vilas Bôas Campos* (1), Maria Lucia Lorenzetti Wodewotzki (2)
(1: Uberlândia Education City Department; 2: UNESP – Paulista State University “Júlio de Mesquita Filho”) PIE CHARTS, AN ALTERNATIVE FOR CHILDREN IN LITERACY CYCLE DEVELOP THE NUMBER SENSE

Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: H: orange, Educational Building, room 106

Group A – Session Chair: Beatriz Vargas Dorneles
Presentations: Lisser Rye Ejersbo* (Aarhus University) HANDS-ON MATERIALS AS INVITATION TO A FANTASY WORLD
Charita Abao Luna*, Marife Valenton Ubalde, Rhoda Agdeppa Namoco (MUST) THE EFFECT OF GENERATIVE TEACHING MODEL ON GRADE VI PUPILS’ ARITHMETIC ACHIEVEMENT AND MATHEMATICS ANXIETY
Shirley Mary Yates* (1), Michelle Coop (2)
(1: Christian Brothers College; 2: Christian Brothers College) MATHEMATICS INTERVENTION FOR LOW ACHIEVING MIDDLE SCHOOL STUDENTS: REVERSING THE TREND
Zheng Jiang* (1,2), Jianhua Li (2), Ida A.C. Mok (1)
(1: The University of Hong Kong; 2: Beijing Normal University) UNDERSTANDING LEVELS OF FRACTION’S MEASURE INTERPRETATION

Location: H: orange, Educational Building, room 209

Group B – Session Chair: Lin Pi-Jen
Presentations: Andrzej Ehrenfeucht* (1), Patricia Baggett (2) (1: University of Colorado; 2: New Mexico State University) TEACHING FRACTIONS USING COUNTING BOARDS
Thulelah Blessing Takane*, Mike Askew (University of the Witwatersrand) TEACHING ADDITIVE RELATIONS IN SOUTH AFRICAN PRIMARY SCHOOLS
Anna Kiss* (Budapest Semesters in Mathematics Education) NUMBER THEORY ON MARS – PRIME CARDS AND BEYOND
Fourth Session: Friday, 29 July 2016, 16.30–18.00
Location: H: orange, Educational Building, room 106

Session Chair: An Shuhua
Presentations: Hsiu-fei Lee* (National Taitung University)
THE KNOWLEDGE OF FRACTION DIVISION OF TAIWANESE SPECIAL EDUCATION TEACHERS

Moshe Moses Phoshoko* (UNISA)
ENRICHING TEACHER SUBJECT MATTER KNOWLEDGE ON THE CONCEPT OF ZERO IN THE CONTEXT OF TEACHING THE OPERATION OF SIGNED NUMBERS

Cristina Morais*, Lurdes Serrazina (Instituto de Educação)
LEARNING RATIONAL NUMBERS IN THE EARLY YEARS: THE ROLE OF REPRESENTATIONS AND THE DECIMAL NUMBERS

Sue Gifford* (University of Roehampton)
MAKING NUMBERS: DEVELOPING GUIDANCE ON THE USE OF MANIPULATIVES IN LAYING THE FOUNDATIONS OF ARITHMETIC

TSG 9 – Teaching and learning of measurement (focus on primary education)

Co-chairs: Christine Chambris (France), Barbara Dougherty (USA)
Team members: Insook Chung (USA), Silke Ruwisch (Germany), (Ravi) K. Subramaniam (India)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: B: dark-brown, East Wing Building, room 233

Session Chairs: Insook Chung, Subramaniam Kalyanasundaram
Presentations: Silke Ruwisch* (Leuphana University Lueneburg)
THE EVALUATION OF ESTIMATED MEASUREMENTS

Hsin-Mei E. Huang* (University of Taipei)
INFLUENCE OF GRADE AND PROBLEM CHARACTERISTIC ON STUDENTS’ PERFORMANCE OF AREA ESTIMATION

Noemí Pizarro*, Nuria Gorgoríó, Lluis Albarracin (Universitat Autònoma de Barcelona)
A CASE STUDY ABOUT AN ACTIVITY OF MEASUREMENT ESTIMATION OF VOLUME
**Second Session: Tuesday, 26 July 2016, 16.30–18.00**  
**Location: B: dark-brown, East Wing Building, room 233**

Session Chairs: Silke Ruwisch, Insook Chung  
Presentations: Andrea Osorio*, Oscar Tamayo  
(Autonoma University of Manizales)  
**EXPLANATORY MODELS AND OBSTACLES IN THE LEARNING OF THE CONCEPT OF UNIT OF MEASUREMENT OF SPACE IN 5 GRADERS OF EL SCHOOO**

Chap Sam Lim* (1), Liew Kee Kor (2), Carolyn Jia Ling Sia (1), Phei Ling Tan (1)  
(1: Universiti Sains Malaysia; 2: Universiti Teknologi MARA Malaysia)  
**TEACHING THE TOPIC ‘TIME’ IN MALAYSIAN PRIMARY SCHOOLS: ISSUES AND CHALLENGES**

Pedro Palhares*, Sara Ribeiro  
(University of Minho)  
**THE BISSEMIS IN THE TEACHING AND LEARNING OF AREA RELATED TOPICS**

Cheng Meng Chew*, Mohd Shafian Shafiee  
(Universiti Sains Malaysia)  
**IMPROVING YEAR 4 PUPILS’ PROFICIENCY IN AREA THROUGH THE CONCRETE-PICTORIAL-ABSTRACT APPROACH**

Insook Chung* (1), JeongSuk Pang (2)  
(1: Saint Mary’s College; 2: Korea National University of Education)  
**INVESTIGATING KOREAN AND U.S. 3RD GRADERS’ LENGTH MEASUREMENT CONCEPTS AND PROCESS SKILLS**

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**TSG 10 – Teaching and learning of early algebra**

Co-chairs: Carolyn Kieran (Canada), JeongSuk Pang (Korea)  
Team members: Swee Fong Ng (Singapore), Deborah Schifter (USA),  
Anna Susanne Steinweg (Germany)  
**PRESERVICE TEACHERS’ MATHEMATICAL KNOWLEDGE FOR TEACHING EARLY ALGEBRA**

Yuriko Yamamoto Baldin* (1), Danilo Eudes Pimentel (2), Jonas Marques dos Santos Queiroz (3)  
(1: Universidade Federal de São Carlos; 2: Fundação Regional Educacional Avaré;  
3: Instituto Educacional Estilo Campinas)  
**THE PRE-ALGEBRA ACTIVITIES IN TRANSITION YEARS FROM ARITHMETIC TO ALGEBRA IN BASIC EDUCATION**

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**First Session: Tuesday, 26 July 2016, 15.00 – 16.00**  
**Location: I: blue, Philosophical Tower, lecture hall F**

Group A – Session Chair: Deborah Schifter  
Presentations: Sharon McAuliffe*  
(Cape Peninsula University of Technology)  
**PRESERVICE TEACHERS’ MATHEMATICAL KNOWLEDGE FOR TEACHING EARLY ALGEBRA**

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Nasim Asghary*
(Islamic Azad University)
BUILDING ALGEBRAIC REASONING OPPORTUNITIES FOR ELEMENTARY STUDENTS: BECOMING A TASK DESIGNER TEACHER

Lorraine Frances Day*, Derek Peter Hurrell
(University of Notre Dame Australia)
PROFESSIONAL LEARNING AS A VEHICLE TO PROMOTE TEACHERS’ CONFIDENCE, ATTITUDES AND BELIEFS ABOUT ALGEBRA

Location: E: mint, Economical Building, room 2079

Group B – Session Chair: Swee Fong Ng
Presentations: Abraham de la Fuente* (1,2), Jordi Deulofeu (1)
(1: Universitat Autònoma de Barcelona (UAB); 2: Oak House School)
TRANSLATION BETWEEN LANGUAGE REPRESENTATION IN PROBLEM SOLVING AS A TOOL TO CONSTRUCT ALGEBRAIC LANGUAGE

Renato Da Silva Ignácio (1,3), Valdir Bezerra Dos Santos Júnior* (2,3), Marlene Alves Dias (3)
(1: Universidade Federal de Campina Grande; 2: Universidade Federal de Pernambuco; 3: Universidade Anhanguera de São Paulo)
PERSONAL RELATIONSHIPS OF A SÃO PAULO STUDENTS GROUP ON ALGEBRA IN THE LIGHT OF THE ANTHROPOLOGICAL THEORY OF DIDACTICS

Jenna Tague*
(California State University)
MODES OF RATE OF CHANGE REASONING IN THE MIDDLE GRADES

Sui Wah Betty Tse*, Wing-yee Angela Yung
(China Victory Theological Seminary)
DISTRIBUTIVE PROPERTY – A GAP FROM ARITHMETIC TO ALGEBRA IDENTIFIED IN THE HONG KONG MATHEMATICS CURRICULUM

Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: E: mint, Economical Building, room 2079

Session Chair: Anna Susanne Steinweg
Presentations: Marios Pittalis*, Demetra Pitta-Pantazi, Constantinos Christou
(University of Cyprus)
TRACING DEVELOPMENTAL PATTERNS IN STUDENTS’ EARLY ALGEBRAIC ARITHMETIC THINKING

Marta Molina (1), Rebecca Ambrose* (2), Aurora del Río (3)
(1: University of Granada; 2: University of California-Davis; 3: University of Granada)
FIRST ENCOUNTER WITH LETTERS IN PRIMARY EDUCATION

Célia Maria Mestre*
(Agrupamento de Escolas Romeu Correia)
SYMBOLIZING WITH MEANING IN COLLECTIVE DISCUSSIONS: A STUDY WITH 4 GRADE STUDENTS
Vera Lucia Merlini, Sandra Magina*, Rogerio Pires, Cesar Teixeira
(Universidade Estadual de Santa Cruz)
ALGEBRAIC REASONING BEFORE LEARNING ALGEBRA IN SCHOOL

Antonio Moreno* (1), Maria C. Cañadas (1), Pilar Jaldo (1), Alfredo Bautista (2)
(1: University of Granada; 2: National Institute of Education (Singapore))
FUNCTIONAL TOPICS IN GRADE 5 STUDENTS’ COMPARISONS
OF TWO LINEAR FUNCTIONS

Ulises Xolocotzin*, Teresa Rojano
(Center for Research and Advanced Studies)
EXPLORING SYMBOL SENSE IN ELEMENTARY SCHOOL

Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: E: mint, Economical Building, room 2079

Session Chair: Deborah Schifter
Presentations: Katharine Bigelow Sawrey* (1), Bárbara M. Brizuela (1), Maria Blanton (2),
Angela Murphy Gardiner (2), Yangsook Kim (1), Aliska Gibbins (1)
(1: Tufts University; 2: TERC)
FOSTERING YOUNG STUDENTS’ RELATIONAL UNDERSTANDING OF THE EQUAL SIGN

Giancarlo Navarra*, Nicolina Malara
(University of Modena and Reggio Emilia (Italy))
TEACHERS’ DIFFICULTIES ON APPROACHING EARLY ALGEBRA:
INTERFERENCES BETWEEN NEW CONCEPTIONS DECLARED AND CHANGE IN DIDACT

Monica M. Neagoy*
(Monica Neagoy Mathematics Consulting)
HOW DO WE PLANT SEEDS OF ALGEBRA IN THE EARLY GRADES?

Daniela Götzze*
(Technische Universität Dortmund)
“IT’S NOTHING ELSE THAN A TERM” – THE EPISTEMIC ROLE OF LANGUAGE
WHILE GENERALIZING NUMERICAL PATTERNS

Fourth Session: Friday, 29 July 2016, 16.30 – 18.00
Location: E: mint, Economical Building, room 2079

Session Chair: Anna Susanne Steinweg
Presentations: Ralph Schwarzkopf* (1), Marcus Nührenbörger (2)
(1: Carl von Ossietzky Universität Oldenburg; 2: Technische Universität Dortmund)
ALGEBRAIC UNDERSTANDING OF EQUALITIES IN PRIMARY CLASSES

Rashmi Singh*, Karl Kosko
(Kent State University)
EFFECT OF THE STRUCTURE OF THE MATHEMATICAL EQUIVALENCE
PROBLEMS ON STUDENTS’ STRATEGY

Amir Hossein Asghari (1,2), Sharareh Taghi Dastjerdii* (2), Maryam Adeli Sardoo (2)
(1: Liverpool John Moores’ university; 2: Isfahan Mathematics House)
MOVING FROM OPERATIONAL VIEW TO RELATIONAL VIEW ON THE HUNDRED GRID
Victoria Kofman*  
(Stella Academy)  
PARAMETER-POINTERS IN EARLY ALGEBRA

Maria Chimoni*  
(University of Cyprus)  
THE MULTIFACETED NOTION OF ALGEBRAIC THINKING IN THE CONTEXT OF ELEMENTARY MATHEMATICS: INSIGHTS FROM EMPIRICAL DATA

TSG 11 – Teaching and learning of algebra

Co-chairs: Rakhi Banerjee (India), Amy Ellis (USA)  
Team members: Helen Chick (Australia), Astrid Fischer (Germany), Heidi Strømskag Måsøval (Norway)

First Session: Tuesday, 26 July 2016, 15.00–16.00  
Location: I: blue, Philosophical Tower, room 761

Group A – Session Chair: Rakhi Banerjee
Julia Meinke*  
(Georg August Universität Göttingen)  
TEACHERS’ SUBJECTIVE THEORIES ON ALGEBRA – THE CASE OF VARIABLES

Olive Chapman*  
(University of Calgary)  
MATHEMATICS TEACHERS’ PERSPECTIVES OF INQUIRY-BASED TEACHING OF ALGEBRA

Süleyman Tursucu*, Steven Flipse, Jeroen Spandaw, Marc de Vries  
(Delft University of Technology)  
TEACHERS’ BELIEF SYSTEMS ABOUT IMPROVING TRANSFER OF ALGEBRAIC SKILLS FROM MATHEMATICS INTO PHYSICS

Rubens Carlos Viriato Júnior*, Raquel Carneiro Dôrr, Jéssica de Aguiar França  
(Universidade de Brasilia)  
PIBID PROGRAM AND ITS IMPORTANCE ON TEACHER EDUCATION IN BRAZIL: AN EXPERIENCE IN BRASILIA

Location: I: blue, Philosophical Tower, room 764

Group B – Session Chair: Amy Ellis
Presentations: Tamara Ogen*, Tamara Avissar, Orna Schneiderman  
(Mofet Association)  
IMPROVING MATHEMATICAL UNDERSTANDING AND PERFORMANCE

Wenjun Zhao* (1), Fuying Wang (2)  
(1: The University of Hong Kong; 2: Center of Educational Research and Teacher Training)  
TEACHING OF ALGEBRA IN A DJP MODEL CLASSROOM

Sonoda Tsuyoshi*  
(Doshisha Junior High School)  
A PLAN OF TEACHING FACTORIZATION BY USING “AREA DIAGRAM” AND “DIRECT PRODUCT TABLE” FOR SECONDARY SCHOOL STUDENTS
Kajsa Bråting (1), Kirsti Hemmi (2), Lars Madej* (1), Ann-Sofi Röj-Lindberg (2)
(1: Uppsala University; 2: Åbo Akademi University)
TOWARDS RESEARCH-BASED TEACHING OF ALGEBRA –
ANALYZING EXPECTED STUDENT PROGRESSION IN THE SWEDISH
CURRICULUM GRADES 1–9

Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: I: blue, Philosophical Tower, room 761

Session Chairs: Rakhi Banerjee, Amy Ellis
Presentations: Reinhard Oldenburg*
(University Augsburg)
NEWS FROM THE REVERSAL ERROR

Alessandro Jacques Ribeiro*
(Federal University of ABC (UFABC))
A CONCEPTUAL PROFILE OF EQUATION: DEVELOPMENTS FOR TEACHING
AND LEARNING OF ALGEBRA

Peter Kop* (1), Fred Janssen (1), Paul Drijvers (2), Jan Van Driel (1)
(1: Iclon Leiden University; 2: Freudenthal Institute Utrecht University)
RECOGNITION AND HEURISTICS IN GRAPHING FORMULAS

Khok Seng Quek, Yew Hoong Leong*, Eng Guan Tay, Sook Fwe Yap, Cherng Luen Tong,
Hui Teck Clement Lee, Wei Yeng Karen Toh
(National Institute of Education)
ALGEBRA THAT MAKES SENSE AND THAT ‘WORKS’

Riikka Palkki*
(University of Oulu)
COMPARING RIGHT AND WRONG SOLUTIONS IN ALGEBRA

Third Session: Friday, 29 July 2016, 15.00–16.00
Location: I: blue, Philosophical Tower, room 761

Session Chair: Rakhi Banerjee
Presentations: Amy Jeanne Hackenberg*, Robin Jones,
Rebecca Borowski, Sukanya Suksak
(Indiana University)
SEVENTH GRADE STUDENTS’ MEANINGS OF DIVISION WITH WHOLE NUMBERS,
FRACTIONS, AND UNKNOWNS

Juan D. Godino (1), Miguel R. Wilhelmi (2), Teresa Neto (3), Lilia Aké (1), Angel Contreras (4),
Antonio Estepa (4), Aitzol Lasa* (2)
(1: University of Granada; 2: Public University of Navarre;
3: University of Aveiro; 4: University of Jaen)
ALGEBRAIZATION LEVELS IN PRIMARY, MIDDLE AND HIGH SCHOOL MATHEMATICS

Sybilla Beckmann*, Andrew Izsak, Eun Jung, Ibrahim Burak Olmez
(University of Georgia)
FRACTIONAL MULTIPLIERS IN EQUATIONS FOR PROPORTIONAL RELATIONSHIPS
Andrea Dorila Cárcamo Bahamonde* (1,2), Josep María Fortuny Aymemí (2),
Joan Vicenc Gómez i Urgellés (3)
(1: Universidad Austral de Chile; 2: Universidad Autónoma de Barcelona;
3: Universidad dPolitécnica de Cataluña)
INSTRUCTIONAL DESIGN BASED ON THE LEARNING TRAJECTORY:
A PROPOSAL FOR THE CONSTRUCTION OF LINEAR ALGEBRA CONCEPTS

Fourth Session: Friday, 29 July 2016, 16.30–18.00
Location: I: blue, Philosophical Tower, room 761

Session Chair: Amy Ellis
Presentations: Clement Onwu Iji*, Godwin Aodohemba Fiase, Odihi Adikwu
(UNIVERSITY OF AGRICULTURE)
UTILIZING VOCABULARY BUILDING INSTRUCTION TO IMPROVE TECHNICAL SCHOOL
STUDENTS’ ACHIEVEMENT AND INTEREST IN ALGEBRA.

Mamosa Mateboho Evodia Ntsohi* (1), Faaz Gierdien (2)
(1: University of Witwatersrand; 2: University of Stellenbosch)
LEARNING EARLY ALGEBRA THROUGH EXCEL SPREADSHEETS IN LESOTHO:
BENEFITS AND CHALLENGES

Ludwig Paditz*
(Dresden University of Applied Sciences)
IMPROVEMENT OF STUDENTS’ UNDERSTANDING OF ALGEBRA OF SETS
AND VENN-DIAGRAMS

Kenneth Allen Horwitz* (1), Carolyn A. Maher (2)
(1: New Jersey Insititute of Technology; 2: Rutgers University)
STUDENT USE OF REPRESENTATIONS IN SOLVING SURFACE AREA AND
VOLUME PROBLEMS

TSG 12 – Teaching and learning of geometry (primary level)

Co-chairs: Sinan Olkun (Turkey), Ewa Swoboda (Poland)
Team members: Paola Vighi (Italy), Yuan Yuan (Chinese Taipei), Bernd Wollring (Germany)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: I: blue, Philosophical Tower, room 564

Session Chair: Yuan Yuan
Presentations: Soohwan Kim (1), Eunjin Kim* (2)
(1: Cheongju National University of Education; 2: Biryong Elementary School)
A CASE STUDY ON CULTIVATING CORE COMPETENCIES IN MATHEMATICS IN
A 3RD GRADE KOREAN CLASSROOM

Sümeyye Gürhan*, Ismail Özgür Zembat
(Mevlana (Rumi) University)
A TECHNOLOGY-BASED INSTRUCTION FOSTERING STUDENTS’ DEVELOPMENT
OF QUADRILATERAL HIERARCHY
Madiha Hassan Abdelrahman*  
(Faculty of Education/ Beni-Suief University)  
THE EFFECTIVENESS OF A SUGGESTED GEOMETRICAL TOOLS TO HELP BLIND PUPILS LEARNING CONSTRUCTIVE GEOMETRY

Yutaka Kondo*  
(Nara University of Education)  
CHARACTERISTICS OF STUDENTS‘ 3D GEOMETRICAL REASONING IN ELEMENTARY SCHOOL

Second Session: Tuesday, 26 July 2016, 16.30–18.00  
Location: I: blue, Philosophical Tower, room 564

Session Chair: Sinan Olkun  
Presentations: Simone Reinhold, Susanne Wöller*  
(Leipzig University)  
CHILDREN’S CONCEPTUAL KNOWLEDGE ON CUBES AND CUBOIDS: INSIGHTS VIA BLOCK BUILDING ACTIVITIES

Francine Athias*  
(Université de Franche-Comté)  
HOW TO EXPLAIN THE SAME LENGTH

Claire Marie-Claude Guille-Biel Winder*  
(ESPE de Nice)  
LEARNING OF THE STUDENTS IN A REPRODUCTION OF FIGURE BY FOLDING

Ken-ichi Iwase* (1), Tomoko Yanagimoto (2), Masato Inoue (3), Taeko Kunimitsu (4), Ryo Nakanishi (5)  
(1: Tennoji Senior High School attached to Osaka-Kyoiku University; 2: Osaka Kyoiku University; 3: Kobe Shinwa Women’s University; 4: Tennoji Elementary School attached to Osaka Kyoiku University; 5: Ikeda Junior High School attached to Osaka Kyoiku Univer)  
MATHEMATICAL KNOTS AS TEACHING MATERIAL TO IMPROVE STUDENT’S SPATIAL ABILITIES

Zeynep Akkurt Denizli* (1), Abdulkadir Erdogan (2), Sinan Olkun (3)  
(1: Ankara University; 2: Anadolu University; 3: TED University)  
THE DEVELOPMENT OF THREE-DIMENSIONALITY IN PRIMARY SCHOOL CHILDREN

Third Session: Friday, 29 July 2016, 15.00–16.00  
Location: I: blue, Philosophical Tower, room 564

Session Chair: Ewa Swoboda  
Presentations: Tuba Aydogdu Iskenderoglu* (2), Elif Aksan (1)  
(1: Karadeniz Technical University; 2: Karadeniz Technical University)  
AN ANALYSIS OF THE DEFINITIONS BY STUDENT CLASSROOM TEACHERS ABOUT TWO-DIMENSION GEOMETRICAL CONCEPTS

Lina Maria Brunheira* (1), João Pedro Ponte (2)  
(1: Escola Superior de Educação; 2: Instituto de Educação)  
THE HIERARCHICAL CLASSIFICATION OF QUADRILATERALS – CHALLENGES FACED BY PROSPECTIVE ELEMENTARY TEACHERS
Xhevdet Thaqi* (1), Joaquim Gimenez (2)
(1: University of Gjilan “Kadri Zeka”; 2: University of Barcelona)

THE PROCES OF UNDERSTANDING OF GEOMETRICAL TRANSFORMATION AS A FUNCTION

**Fourth Session: Friday, 29 July 2016, 16.30–18.00**
**Location: I: blue, Philosophical Tower, room 564**

Session Chair: Paola Vighi
Presentations: Jill A. Cochran* (1), Zane Cochran (1,2), Meredith Hopper (1)
(1: Berry College; 2: Georgia Institute of Technology)
WILL IT PRINT? UNDERSTANDING DIMENSIONS WITH 3D PRINTING

Sylvia Coutat*
(Université de Genève)
SHAPE RECOGNITION IN EARLY SCHOOL

Małgorzata Zambrowska* (1), Ewa Swoboda (2)
(1: Institute of Educational Research Poland; 2: University of Rzeszów)
STUDENTS’ MENTAL MANIPULATION OF A SHAPE AT THE EARLY EDUCATIONAL LEVEL

Ajay Ramful, Tom Lowrie*
(University of Canberra)
MENTAL ROTATION ABILITY OF 11–13 YEAR OLD STUDENTS: A DEVELOPMENTAL PERSPECTIVE FROM A NOVEL INSTRUMENT

**TSG 13 – Teaching and learning of geometry – secondary level**

Co-chairs: Ui Hock Cheah (Malaysia), Patricio Herbst (USA)
Team members: Matthias Ludwig (Germany), Philippe Richard (Canada), Sara Scaglia (Argentina)

**First Session: Tuesday, 26 July 2016, 15.00–16.00**
**Location: E: mint, Economical Building, room 0076a**

Group A – Session Chair: Ui-Hock Cheah
Presentations: Vladimir Alekseevich Smirnov*, Irina Mikhailovna Smirnova
(Moscow State Pedagogical University)
COMBINATORIAL PROBLEMS IN SCHOOL GEOMETRY

Rukiye Ayan*, Mine Isiksal-Bostan
(Middle East Technical University)
MIDDLE SCHOOL STUDENTS’ (MIS)INTERPRETATIONS OF LENGTH TO VOLUME RELATIONSHIPS

Kalliopi Siopi*, Eugenia Koleza
(University of Patras)
ARTIFACT BASED GEOMETRIC CONSTRUCTIONS
Location: E: mint, Economical Building, room 0078

Group B – Session Chair: Patricio G. Herbst
Presentations: Andrew Anthony Hunte* (University of Illinois at Urbana-Champaign)
GEOMETRY OPPORTUNITIES FOR REASONING AND PROOF IN SECONDARY SCHOOL TEXTBOOKS IN TRINIDAD AND TOBAGO

José Agustín Villella*, Gema Fioriti, Alejandra Almirón, Susana Carmen Ammann, Fernando Bifano, Rosa Ana Ferragina, Leonardo José Lupinacci (Universidad Nacional de San Martín)
NOTES FOR THE TEACHING OF GEOMETRY IN SECONDARY SCHOOL: A TEACHER TRAINING EXPERIENCE

Gili Gal Nagar* (UMass Dartmouth)
TEACHERS’ PROVING PROCESS IN DYNAMIC ENVIRONMENT: THE INSCRIBED ANGLE THEOREM

Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: E: mint, Economical Building, room 0076a

Session Chair: Philippe R. Richard
Presentations: Ming-Jang Chen* (1), Chun-Yi Lee (2)
(1: National Chiao Tung University; 2: National Taipei University)
CONTEXT INTEGRATION EFFECTS ON GEOMETRY LEARNING OF JUNIOR HIGH SCHOOL STUDENTS

Mitsue Arai* (Hiroshima University)
ASPECTS OF SPATIAL THINKING IN PROBLEM SOLVING: FOCUSING ON VIEWPOINTS IN CONSTRUCTING INTERNAL REPRESENTATION

Takuma Takayama* (Machida 1 Junior High School)
CENTER OF GRAVITY OF VARIOUS FIGURES

Luz Graciela Orozco Vaca* (1), Ricardo Quintero Zazueta (2)
(1: CINVESTAV; 2: CINVESTAV)
THE USE OF WRITING AS A METACOGNITIVE TOOL IN GEOMETRY LEARNING

Third Session: Friday, 29 July 2016, 15.00–16.00
Location: E: mint, Economical Building, room 0076a

Session Chair: Patricio Herbst
Presentations: Fadime Ulusoy*, Erdinç Çakiroglu (Middle East Technical University)
PROSPECTIVE TEACHERS’ PERSONAL AND INSTRUCTIONAL DEFINITIONS FOR QUADRILATERALS
Richard *Walsh*, Olivia *Fitzmaurice*, John *O’Donoghue*  
(Department of Mathematics and Statistics)  
**IRISH PRE-SERVICE TEACHERS’ SUBJECT MATTER KNOWLEDGE OF SECONDARY LEVEL TRIGONOMETRY**

Shawnda Rae *Smith*  
(Texas State University)  
**GEOMETRY TEACHING KNOWLEDGE: A COMPARISON BETWEEN PRE-SERVICE AND HIGH SCHOOL GEOMETRY TEACHERS**

**Fourth Session: Friday, 29 July 2016, 16.30 – 18.00**  
**Location: E: mint, Economical Building, room 0076a**

Session Chair: Matthias *Ludwig*  
Presentations: Chrysi *Papadaki*  
(University of Bremen)  
**THE INTERPLAY BETWEEN VISUALIZATION AND ARGUMENTATION IN THE TEACHING OF GEOMETRY**

Neslihan *Bulut* (1), Sefa *Dündar** (2), Mehmet *Eren* (1)  
(1: Gazi University; 2: Abant Izzet Baysal University)  
**PROSPECTIVE TEACHERS’ KNOWLEDGE ABOUT VECTORS AND ITS APPLICATIONS TO ALGEBRAIC AND GRAPHICAL PROBLEMS**

Sima *Rabbi**, Nasim *Asghary*  
(Department of Mathematics)  
**SIMA RABBI**

Seyda *Birni* (1), Zekeriya *Karada* (2)  
(1: Bayburt University; 2: Giresun University)  
**IS GEOMETRIC LITERACY NECESSARY?**

**TSG 14 – Teaching and learning of probability**

Co-chairs: Carmen *Batanero* (Spain), Egan *Chernoff* (Canada)  
Team members: Joachim *Engel* (Germany), Ernesto *Sánchez* (Mexico), Hollylynne *Lee* (USA)

**First Session: Tuesday, 26 July 2016, 15.00 – 16.00**  
**Location: K: purple, Law Building, room 10**

Session Chair: Egan *Chernoff*  
Presentations: Vincent *Martin**, Laurent *Theis*  
(University of Sherbrooke)  
**THE TEACHING OF PROBABILITY TO STUDENTS JUDGED OR NOT WITH DIFFICULTIES IN MATHEMATICS IN ELEMENTARY CLASSES IN QUEBEC**

Signe Holm *Knudtzon*  
(Buskerud and Vestfold University College)  
**PITFALLS AND SURPRISES IN THE TEACHING OF PROBABILITY**
Raimundo José Elicer* (1), Eduardo Andrés Carrasco (2)
(1: Universidad Austral de Chile; 2: Universidad Metropolitana de Ciencias de la Educación)
CONDITIONAL PROBABILITY AS A DECISION MAKING TOOL: A DIDACTIC SEQUENCE

Mónica Giuliano*, Silvia Pérez, Martín García
(Universidad Nacional de La Matanza)
TEACHING PROBABILITY AND STATISTICS WITH E-STATUS

Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: K: purple, Law Building, room 10

Session Chairs: Carmen Batanero, Ernesto Sánchez
Presentations: M. Pedro Huerta*
(Universitat de València)
PREPARING TEACHERS FOR TEACHING PROBABILITY THROUGH PROBLEM SOLVING

Katharina Böcherer-Linder* (1), Andreas Eichler (2), Markus Vogel (3)
(1: University of Education Freiburg; 2: University Kassel; 3: University of Education Heidelberg)
THE IMPACT OF VISUALIZATION ON UNDERSTANDING CONDITIONAL PROBABILITIES

Isaias Miranda-Viramontes* (1), Beatriz Adriana Rodríguez-González (2)
(1: Instituto Politécnico Nacional; 2: Universidad Politécnica de Zacatecas)
UNDERSTANDING PROFESSORS’ DECISIONS TO ASSESS STUDENTS’ LEARNING OF PROBABILITY

Augusta Rosa Osorio*
(Pontificia Universidad Católica del Perú)
STRENGTHENING OF ELEMENTARY TEACHERS IN THE USE OF PROBABILITY IN EVERYDAY LIFE EVENTS

Jesús Humberto Cuevas Acosta (1), Grevin Ramírez Arce* (2)
(1: Technological Institute of Chihuahua II; 2: Technological Institute of Costa Rica)
PERFORMANCE IN STOCHASTIC BETWEEN SECONDARY TEACHERS AND TEACHING STUDENTS: COMPARATIVE STUDY IN COSTA RICA AND MÉXICO

Annarosa Serpe*, María Giovanna Frassia
(University of Calabria)
MATHEMATIZATION OF UNCERTAINTY WITH THE AID OF COMPUTERS: A MODEL OF ACTIVITY IN HIGH SCHOOL

Third Session: Friday, 29 July 2016, 15.00–16.00
Location: K: purple, Law Building, room 10

Session Chair: Joachim Engel
Presentations: Jorge Soto-Andrade, Daniela Diaz-Rojas, Pamela Reyes-Santander*
(CIAE & Depto. Matemáticas; Pontificia Universidad Católica de Valparaíso)
RANDOM WALKS AS LEARNING SPROUTS IN THE DIDACTICS OF PROBABILITY

Blanca Ruiz Hernández*
(Tecnológico de Monterrey)
RANDOM VARIABLE AND ITS RELATIONSHIP WITH STATISTICAL VARIABLE: AN EDUCATIONAL PERSPECTIVE FROM ACONCEPT ANALYSIS
Representations in Probability Problems

Fourth Session: Friday, 29 July 2016, 16.30–18.00
Location: K: purple, Law Building, room 10

Session Chair: Hollylynne Lee
Presentations: Ana Serrado-Bayes* (Colegio La Salle-Buen Consejo)
Enhancing reasoning on risk management through a decision-making process on a game of chance task

Santiago Inzunsa* (Universidad Autónoma de Sinaloa)
Connecting theoretical probability and experimental probability in a modeling environment

Shengqing He* (1), Zikun Gong (2)
(1: Beijing Normal University; 2: Hangzhou Normal University)
Children’s learning progressions on probability and suggestions for curriculum improvement

TSG 15 – Teaching and learning of statistics

Co-chairs: Dani Ben-Zvi (Israel), Gail Burrill (USA)
Team members: Andreas Eichler (Germany), Dave Pratt (UK), Lucia Zapata-Cardona (Columbia)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: E: mint, Economical Building, room 0079

Session Chair: Dave Pratt
Presentations: Eun-Sung Ko* (Jeonju National University of Education)
Framework for the teaching of statistical problem solving at school level

Xie Yangchun* (The Affiliated High School of Gannan Normal University)
Lesson study: investigating core concepts in classrooms of statistics – a case study

Jase Moussa-Inaty*, Mark Causapin (Zayed University)
Cognitive load during simulation-based instruction on binomial probability distributions
Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: E: mint, Economical Building, room 2054/55

Session Chair: Dani Ben-Zvi
Presentations: Soledad Estrella*, Raimundo Olfos
(Pontificia Universidad Catolica de Valparaiso)
EARLY STATISTICS: GRAPHICAL REPRESENTATIONS AND TRANSMERATION IN 3RD GRADE STUDENTS

Sonia Kafoussi*
(University of the Aegean)
TEACHING STATISTICS IN PRIMARY SCHOOL: COLLECTING AND ORGANIZING DATA

Danijela Marolt*
(Gimnazija Celje – Center)
PRACTICAL APPLICATION OF STATISTICAL METHODS IN THE GOLDEN APPLE SCHOOL PROJECT

Ratu Ilma Putri* (1), Zulkardi Zulkardi (1), Maarten Dolk Dolk (2)
(1: Sriwijaya University; 2: Utrecht University)
COMMUNICATING AND REPRESENTING STUDENTS SKILL USING SOCIO MATHEMATICAL NORMS IN CLASSROOM ABOUT DATA REPRESENTATION: ONE

Luciane Mulazani dos Santos, Joana Steil Alves, Elisa Henning*, Ivanete Zuchi Siple
(Santa Catarina State University)
STATISTICAL LITERACY OF CHILDREN INVESTIGATED WITH THE SUPPORT OF INFORMATION AND COMMUNICATION TECHNOLOGIES

Third Session: Friday, 29 July 2016, 15.00–16.00
Location: E: mint, Economical Building, room 0079

Session Chair: Gail Burrill
Presentations: Hui Teng Chia*
(Singapore Polytechnic)
SINGAPORE DIPLOMA IN ENGINEERING MATHEMATICS LECTURERS’ INTERPRETATIONS OF STATISTICAL LITERACY: A CASE STUDY

Arjen De Vetten* (1,2), Judith Schoonenboom (3), Ronald Keijzer (2,4), Bert Van Oers (1)
(1: Vrije Universiteit Amsterdam; 2: Hogeschool iPabo; 3: Universität Wien; 4: Utrecht University)
EXPLORING STUDENT TEACHERS’ REASONING ABOUT INFORMAL STATISTICAL INFERENCE WHEN ENGAGED IN A GROWING SAMPLES ACTIVITY

Orlando Rafael González González* (1,2), Somchai Chitmun (3)
(1: Hiroshima University; 2: Assumption University; 3: Srimahosot School)
ASSESSING SPORT OUTCOMES AS A WAY TO BUILD STUDENTS’ DATA-DRIVEN DECISION-MAKING SKILLS

Gilda Lisbôa Guimarães* (1), Izabella Oliveira (2)
(1: University Federal of Pernambuco; 2: University Laval)
CLASSIFYING: COMPREHENSION OF STUDENTS AND TEACHERS OF PRIMARY SCHOOL
Fourth Session: Friday, 29 July 2016, 16.30–18.00
Location: E: mint, Economical Building, room 2054/55

Session Chair: Lucia Zapata-Cardona
Presentations: Gamze Kurt*
(Middle East Technical University)
PRESERVICE MATHEMATICS TEACHERS’ TPACK DEVELOPMENT IN STATISTICS TEACHING: A LESSON STUDY

Aisling M. Leavy* (1), Finbarr Sloane (2)
(1: University of Limerick; 2: National Science Foundation)
PROSPECTIVE PRIMARY TEACHERS UNDERSTANDINGS OF GRAPHS

Byungjoo Tak* (1), Na-Young Ku (1), Hyun-Young Kang (2), Kyeong-Hwa Lee (1)
(1: Seoul National University; 2: Mokwon University)
KOREAN PRESERVICE TEACHERS’ KNOWLEDGES FOR TEACHING STATISTICAL SAMPLE

TSG 16 – Teaching and learning of calculus

Co-chairs: David Bressoud (USA), Victor Martinez-Luaces (Uruguay)
Team members: Imène Ghedamsi (Tunisia), Günter Törner (Germany)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: E: mint, Economical Building, room 3017

Group A – Session Chair: Günter Törner
Presentations: Sergiy Klymchuk*
(Auckland University of Technology)
USING COUNTEREXAMPLES, PUZZLES AND PROVOCATIONS FOR ENHANCING TEACHING AND LEARNING OF CALCULUS

Angie Hodge*, Janice Rech
(University of Nebraska Omaha)
TERTIARY CALCULUS: WHY AND HOW IT CAN BE USED TO SHAPE HOW FUTURE MATHEMATICS TEACHERS TEACH

Raquel Carneiro Dörr*, Cristiano Alberto Muniz
(University of Brasilia)
THE MATHEMATICAL KNOWLEDGE OF CALCULUS STUDENTS AND POSSIBLE RELATIONS WITH EVASION AND FAILURE

Higinio Ramos*, Susana Nieto
(Universidad de Salamanca)
A NOVEL PROCEDURE FOR OBTAINING INDEFINITE INTEGRALS USING THE CONCEPT OF INVERSE OF A FUNCTION
Location: E: mint, Economical Building, room 3030

**Group B – Session Chair: Imène Ghedamsi**
Presentations: Stefanie Arend*
(Carl von Ossietzky Universität Oldenburg)
UNDERSTANDING-ORIENTED HANDLING OF THE EPSILON-DELTA-DEFINITION OF CONTINUITY BY STUDENTS OF MATHEMATICS

Aggeliki Efstathiou*, Joanna Mamonna-Downs
(University of Patras)
BUILDING UP ALTERNATIVE DEFINITIONS. THE CASE OF THE LIMIT FOR ONE VARIABLE REAL FUNCTION

Karel Hrbacek (3), Olivier Lessmann (2), Richard O’Donovan* (1)
(1: Collège André-Chavanne; 2: Collège Rousseau; 3: CUNY)
CALCULUS USING PROXIMITIES: AN APPROACH IN WHICH STUDENTS CAN ACTUALLY PROVE THEOREMS

Analia Bergé*
(Université du Québec à Rimouski)
PROVING WHAT SEEMS TO BE EVIDENT

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Second Session: Tuesday, 26 July 2016, 16.30 – 18.00
Location: E: mint, Economical Building, room 3017

**Group A – Session Chair: Günter Törner**
Presentations: Ajit Kumar*
(ICT Mumbai)
TEACHING CALCULUS USING SAGE

Hans-Jürgen Elschenbroich*
(Medienberatung NRW (retired))
A VISUAL APPROACH TO BASIC CONCEPTS OF CALCULUS

Eyup Sevimli*
(Gaziosmanpa a University)
EVALUATING THE EFFECTS OF TECHNOLOGY USE ON THE LEARNING OUTCOMES IN CALCULUS: PERSPECTIVES FROM DEPARTMENTAL DIFFERENCES

Matti Pauna*
(University of Helsinki)
REDESIGNING CALCULUS CURRICULUM WITH ONLINE COURSES

Igor Yakov Subbotin* (1), Nikolai Nikolai Bilotskii (2)
(1: National University; 2: Kiev National Pedagogic University)
ALGORITHMS AND ELEMENTARY FUNCTIONS: TWO SIDES OF THE SAME FUNDAMENTAL NOTION

Anna-Katharina Roos*
(University of Würzburg)
MISCONCEPTIONS OF MATHEMATICS STUDENTS ABOUT REAL FUNCTIONS
Location: E: mint, Economical Building, room 3030

Group B – Session Chair: Imène Ghedamsi
Presentations: Laura Conejo Garrote*, Matías Arce Sánchez, Tomás Ortega del Rincón
(University of Valladolid)
THE USE OF PROOF SCHEMES AND PREFORMAL PROOFS IN THE TEACHING OF THE CONCEPT OF LIMIT: A SUPPORTING MATERIAL

Laure Isabelle Barthel*
(Hadassah Academic College)
LOCAL PROPERTIES IN CALCULUS: A UNIFYING THEME

Christine Alyssa Herrera*
(Texas State University)
AN ANALYTICAL FRAMEWORK OF ANALYSIS STUDENTS’ CONCEPTUALIZATION OF LIMITS

Rita Desfitri*
(University of Bung Hatta)
IN-SERVICE TEACHERS’ UNDERSTANDING ON LIMIT AND DERIVATIVE AND THOSE IMPACT TO TEACHING AND LEARNING PROCESS

Behiye Ubuz*, Utkun Aydin
(Middle East Technical University)
MODELS OF MATHEMATICAL THINKING ABOUT THE DERIVATIVE: A MULTILEVEL ANALYSIS

Marcel Klinger*
(University of Duisburg-Essen)
ASsessing students’ understanding of the concept of differentiation and a function’s parameters

Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: E: mint, Economical Building, room 3017

Session Chair: David Bressoud
Presentations: Miguel Diaz*
(Universidad Pedagogica Nacional)
CONCEPTS OF CALCULUS: UNDERSTANDING OF HIGH SCHOOL TEACHERS IN MEXICO

Rebecca Anne Dibbs*
(Texas A&M Commerce)
DIFFERENTIAL PARTICIPATION IN POST-CLASS REFLECTIONS AND CONCEPT ACQUISITION IN INTRODUCTORY CALCULUS

Monica Panero* (1,2)
(1: Institut Français de l’Education; 2: Dipartimento di Matematica)
FROM $F'(X_0)$ TO $F'(X)$

Dennis Balanay Roble*, Christina Valdez Maglipong
(Mindanao University of Science and Technology)
FACTORS AFFECTING STUDENTS’ CONCEPTUAL UNDERSTANDING OF AREA OF PLANE REGIONS IN INTEGRAL CALCULUS
Fourth Session: Friday, 29 July 2016, 16.30–18.00  
Location: E: mint, Economical Building, room 3017

Session Chair: David Bressoud
Presentations: Paloma Puerto* (1), Natividad Adamuz (2), Rafael Bracho (2), Veronica Albanese (3)  
(1: IES Averroes; 2: Universidad de Córdoba; 3: Universidad de Granada)

CALCULATION ALGORITHMS: A LITERATURE REVIEW
Sonia Barbosa Camargo Igliori, Marcio Vieira Almeida* (Pontifical Catholic University of São Paulo (PUC/SP))

DEVELOPING MATERIALS FOR DIFFERENTIAL AND INTEGRAL CALCULUS
André Henning* (Humboldt-Universität zu Berlin)

LINEAR APPROXIMATION AND THE DERIVATIVE IN LOWER SECONDARY SCHOOL
Manuel Estrella, José Antonio Fernández-Plaza*, Luis Rico (University of Granada)

CONSISTENCY BETWEEN THE DEFINITION AND COUNTEREXAMPLES ON THE TENDENCY OF A FUNCTION AT A POINT
Mario Adrián Caballero-Pérez*, Ricardo Cantoral (Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional)

DEVELOPMENT OF VARIATIONAL THINKING AND LANGUAGE FOR THE TEACHING AND LEARNING OF CALCULUS

TSG 17 – Teaching and learning of discrete mathematics (including logic, game theory and algorithms)
Co-chairs: Eric Hart (USA), Cecile O. Buffet (France)
Team members: Hans-Wolfgang Henn (Germany), Jim Sandefur (USA), Ahmed Semri (Algeria)

First Session: Tuesday, 26 July 2016, 15.00–16.00  
Location: I: blue, Philosophical Tower, room 713

Session Chairs: Eric W. Hart, James Sandefur
Presentations: James Sandefur* (1), Kay Somers (2), Rosalie Dance (3)  
(1: Georgetown University; 2: Moravian College; 3: University of Virgin Islands)

RECURSION VERSUS CLOSED FORMULAS
Maria Flavia Mammana*, Daniela Ferrarello (University of Catania)

GRAPH THEORY IN PRIMARY, MIDDLE AND HIGH SCHOOL
Antonio Kennedy Lopes Dantas*, Manassés da Silva Batista, Neurivan Humberto Cardoso de Castro, Francismar Holanda (Federal Institute of piaui)
Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: I: blue, Philosophical Tower, room 713

Session Chairs: James Sandefur, Eric W.Hart
Presentations: Elise Lockwood*
( Oregon State University)
GENERALIZATION IN STUDENTS’ COMBINATORIAL THINKING

Lisa Rougetet*
(University of Lille)
MACHINES DESIGNED TO PLAY NIM GAMES AS TEACHING SUPPORT FOR
MATHEMATICS, ALGORITHMS AND COMPUTER SCIENCE (1940 – 1970)

Vladimir Igoshin*
(Saratov State University)
MATHEMATICS AND LOGIC: THEIR RELATIONSHIP IN THE TRAINING OF
TEACHERS OF MATHEMATICS

Fourth Session: Friday, 29 July 2016, 16.30 – 18.00
Location: I: blue, Philosophical Tower, room 713

Session Chairs: Eric W. Hart, James Sandefur
Presentations: Catherine Vistro-Yu*, Flordeliza Francisco
(Ateneo de Manila University)
DISCRETE MATHEMATICS IN THE GENERAL EDUCATION CURRICULUM

Ödön Vancsó* (1), György Emese (2), Eleonora Stettner (3), Judit Szitányi (1)
(1: Eötvös Loránd Tudományegyetem; 2: Újpest Bilingual Technical Secondary School;
3: University of Kaposvár)
COMPLEX MATHEMATICS EDUCATION IN THE 21ST CENTURY –
IMPROVING COMBINATORIAL THINKING BASED ON T. VARGA’S HERITAGE

Aaron Gaio*, Benedetto Di Paola
(University of Palermo)
I LIKE DISCRETE MATHEMATICS, BUT I DO NOT KNOW HOW TO TEACH IT

TSG 18 – Reasoning and proof in mathematics education

Co-chairs: Guershon Harel (USA), Andreas Stylianides (UK)
Team members: Paolo Boero (Italy), Mikio Miyazaki (Japan), David Reid (Germany/Canada)

First Session: Tuesday, 26 July 2016, 15.00 – 16.00
Location: I: blue, Philosophical Tower, room 756

Group A – Session Chair: Guershon Harel
Presentations: Dan Jazby*
(University of Melbourne)
TEACHER DISCURSIVE PRACTICES WHICH SUPPORT PRIMARY STUDENTS’
DEVELOPMENT OF DEDUCTIVE REASONING
Esther Brunner* (1), Kurt Reusser (2), Christine Pauli (3)
(1: Thurgau University of Teacher Education; 2: Institute of Education; 3: Institute of Education)
DO TEACHERS TAKE FULL ADVANTAGE OF THE POTENTIAL PROVIDED BY DIFFERENT TYPES OF MATHEMATICAL PROOF?

Horacio C. Solar* (1), Jordi Deulofeu (2)
(1: Pontificia Universidad Católica de Chile; 2: Universidad Autónoma de Barcelona)
CONTINGENCY IN MATHEMATICS LESSONS THROUGH ARGUMENTATIVE ORCHESTRATION

Zahra Rahimi* (1), Ebrahim Talaee (2), Ebrahim Reihani (3), Hashem Fardanesh (4)
(1: Tarbiat Modares University; 2: Tarbiat Modares University; 3: Shahid Rajaee University;
4: Tarbiat Modares University)
DESIGNING AN INSTRUCTIONAL MODEL FOR REALIZATION OF MATHEMATICAL THINKING IN SECONDARY SCHOOL STUDENTS

Location: I: blue, Philosophical Tower, room 1009

Group B – Session Chair: Mikio Miyazaki
Presentations: Abdellah El Idrissi* (1), Omar Rouan (2)
(1: CFIE; 2: ENS)
AREA AS A TOOL IN MATHEMATICAL PROOFS SOME HISTORICAL CASES

Stacy Brown*
(California State Polytechnic University)
TO BE OR NOT TO BE: STUDENTS’ REASONING ABOUT THE CONSTRUCTIVE DILEMMA

Guangxiang Zhang*
(Southwest University)
FROM ORIGINAL INDUCTION TO NUMERICAL REASONING

Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: I: blue, Philosophical Tower, room 756

Group A – Session Chair: Andreas Stylianides
Presentations: Chao Zhou*
(Soochow university)
A SURVEY OF 94 ELEMENTARY MATHEMATICS TEACHERS ABOUT MAY MATHEMATICAL REASONING BE TAUGHT AT ELEMENTARY SCHOOL PERIOD

Koji Iwata* (1), Mikio Miyazaki (2), Tomohiko Makino (3), Taro Fujita (4)
(1: Fukuoka University of Education; 2: Shinshu University;
3: Utsunomiya University; 4: University of Exeter)
LEARNING OF APPLICATION OF FUNCTIONS THROUGH CONSTRUCTING PROOFS

Joana Mata-Pereira*, João Pedro Ponte
(Instituto de Educação)
ENHANCING STUDENTS’ MATHEMATICAL REASONING IN WHOLE CLASS DISCUSSIONS

Muhammed Fatih Dogan*
(University of Wisconsin-Madison)
NATURE OF TEACHERS’ ENGAGEMENTS IN PROVING ACTIVITIES
Nadia Douek* (Université de Nice)
PROMOTING EXPLORATION IN THE PERSPECTIVE OF TEACHING AND LEARNING PROVING PRACTICES IN MATHEMATICS

Location: I: blue, Philosophical Tower, room 1009

Group B – Session Chair: Mikio Miyazaki
Presentations: Fernanda Aparecida Ferreira* (1), Cintia A. Bento Santos (2)
(1: CEFET/MG; 2: UNICSUL/SP)
MATHEMATICAL PROOFS: INTERPRETATIVE ANALYSIS OF RESEARCHES PRESENTED AT ICME BETWEEN 2003 AND 2013

Jenny Christine Cramer* (University of Bremen)
ANALYZING OBSTACLES FOR MATHEMATICAL ARGUMENTATION

Isil Isler* (Isil Isler)
WHAT ARE ELEMENTARY TEACHERS’ EXPECTATIONS REGARDING REASONING AND PROOF IN SCHOOL MATHEMATICS?

Eva Müller-Hill* (Universität zu Köln)
ASPECTS OF OPERATIONAL MATHEMATICAL EXPLANATION

Tuyin An* (Purdue University)
PRESERVICE SECONDARY MATHEMATICS TEACHERS’ CONCEPTION OF APPLICATION OF THEOREMS IN GEOMETRY

Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: I: blue, Philosophical Tower, room 756

Group A – Session Chair: David Reid
Presentations: Cynthia L. Stenger*, James A. Jerkins, Janet T. Jenkins, Jessica E. Stovall (University of North Alabama)
USING COMPUTER PROGRAMMING TO TEACH GENERALIZATION

Erna Lampen* (RUMEUS)
PROBLEMATISING THE CIRCLE: MATHEMATICS EDUCATION STUDENTS’ CONSTRUCTION REASONING

Markus Hohenwarter (1), Zoltán Kovács* (2), Tomás Recio (3)
(1: Johannes Kepler University; 2: The Private University College of Education of the Diocese of Linz; 3: University of Cantabria)
DECIDING GEOMETRIC PROPERTIES SYMBOLICALLY IN GEOGEBRA

Fatemeh Ahmadpour Mobarakhe*, Mohamad Reza Fadaee (Shahid Bahonar University of Kerman)
THE STATUS OF REASONING AND PROOF IN IRANAIN SEVENTH-GRADE MATHEMATICS TEXTBOOK
**Location: I: blue, Philosophical Tower, room 1009**

**Group B – Session Chair: Paolo Boero**

Presentations: Barry J. Griffiths*  
(University of Central Florida)  
A COMPARISON OF SYLLOGISTIC REASONING SKILLS AMONG AMERIC. UNDERGRADUATES

Marta T. Magiera*, Vecihi S. Zambak  
(Marquette University)  
ANALYSIS OF ARGUMENTS FORMULATED BY GRADES 1–8 PROSPECTIVE TEACHERS IN “CONSTRUCTING” AND “CRITIQUING” PROBLEM SITUATION

Hyejin Park*  
(University of Georgia)  
ONE COLLEGE STUDENT’S PERCEPTIONS OF PROOF METHODS AND CHARACTERISTICS OF CHOOSING PROOF METHODS IN CONSTRUCTING PROOFS

Wang ZhiLing*  
(East China Normal University)  
CASES STUDY ON EIGHT GRADE STUDENTS’ PSYCHOLOGICAL MODEL OF GEOMETRIC REASONING AND PROOF – IN CASE OF CONGRUENT TRIANGLES

**Fourth Session: Friday, 29 July 2016, 16.30–18.00**

**Location: I: blue, Philosophical Tower, room 756**

**Group A – Session Chair: David Reid**

Presentations: Johnny Alfredo Vanegas Diaz*  
(Universidad Autónoma de Guerrero)  
RECONSTRUCTION OF AN ABDUCTIVE STRUCTURE: THE CASE OF EQUAL AREAS IN GEOMETRY

Naomi Prusak*, Osama Swidan, Baruch Schwarz  
(Hebrew University of Jerusalem)  
FROM PEER ARGUMENTATION TO DEDUCTIVE REASONING AND PROOFS

Nadia Azrou*  
(University Yahia Fares)  
PROOF TEXT WRITING AT THE UNDERGRADUATE LEVEL: NEW FINDINGS FROM STUDENTS’ INTERVIEWS

Sonia Abrantes Garcez Palha* (1,2), Jeroen Spandaw (3)  
(1: University of Amsterdam; 2: University of Applied Sciences of Amsterdam; 3: Delf University of Technology)  
HOW COLLABORATIVE REASONING CONTRIBUTES TO STUDENT’S UNDERSTANDING OF INTEGRALS?

**Location: I: blue, Philosophical Tower, room 1009**

**Group B – Session Chair: Paolo Boero**

Presentations: Christian Fahse*  
(University of Koblenz-Landau)  
DIFFERENT TYPES OF ARGUMENTATION IN A QUASI-LONGITUDINAL STUDY IN A SECONDARY SCHOOL
Helena Johansson*  
(University of Gothenburg)  
REAL-LIFE CONTEXT AND MATHEMATICAL REASONING –  
INFLUENCES ON STUDENTS’ SUCCESS ON MATHEMATICS TASKS

Zwelithini Bongani Dhlamini*, Kabelo Chuene  
(University Of Limpopo)  
MATHEMATICAL REASONING STRATEGIES THAT ARE CHALLENGING FOR  
LEARNERS IN THE ANA IN SOUTH AFRICA

Margo F. Kondratieva*  
(Memorial University)  
WHAT CAN BE LEARNER BY TEACHERS THROUGH THE PROCESS OF  
COLLECTIVE PRODUCTION OF MULTIPLE PROOFS?

TSG 19 – Problem solving in mathematics education

Co-chairs: Peter Liljedahl (Canada), Manuel Santos Trigo (Mexico)  
Team members: Uldarico Malaspina (Peru), Guido Pinkernell (Germany), Laurent Vivier (France)

First Session: Tuesday, 26 July 2016, 15.00–16.00  
Location: E: mint, Economical Building, room 4018

Group A – Session Chair: Peter Liljedahl  
Presentations: Jong Cherng Meei*, Chiew Chin Mon  
(Teacher Education Institute Tuanku Bainun Campus)  
PROBLEM SOLVING BELIEFS OF PRE-SERVICE MATHEMATICS TEACHERS:  
A MALAYSIAN PERSPECTIVE

Behnaz Savizi*  
(educational ministry)  
7TH GRADE TEACHERS’ BELIEFES ABOUT PROBLEM SOLVING HEURISTICS  
IN IRANIAN MATHEMATICS TEXTBOOKS

Patricio Felmer*, Josefa Perdomo-Diaz, Cristián Reyes  
(University of Chile)  
PROBLEM SOLVING FOR TEACHERS’ PROFESSIONAL DEVELOPMENT

Location: E: mint, Economical Building, room 4020

Group B – Session Chair: Manuel Santos  
Presentations: Yip Cheung Chan*  
(The Chinese University of Hong Kong)  
EXPERIMENTATION AND REASONING INTERPLAY IN THE PROCESS OF  
PROBLEM SOLVING WITH THE USE OF DYNAMIC GEOMETRY SOFTWARE

Qing Li*, Shu Wen Li  
(Northeast Normal University)  
RESEARCH ON THE RELATIONSHIPS AMONG KNOWLEDGE, STRATEGY AND  
META-COGNITION IN MATHEMATICAL PROBLEM SOLVING
Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: E: mint, Economical Building, room 4018

Group A – Session Chair: Manuel Santos
Presentations: Sheila Evans* (University of Nottingham)
ORCHESTRATING PRODUCTIVE WHOLE CLASS DISCUSSIONS: THE ROLE OF DESIGNED STUDENT RESPONSES

Jennifer Lynne Wise* (Hand Middle School/University of South Carolina)
STUDENT LEARNING COMMUNITIES: STRENGTHENING STUDENT PROBLEM SOLVING SKILLS

Hoyun Cho* (1), Gary Lawrence (2)
(1: Capital University; 2: Mustard Seed School)
DEVELOPING A POSITIVE SCHOOL CULTURE WITH TEACHING MATHEMATICS THROUGH PROBLEM SOLVING

Ana María Vozzi* (Universidad Nacional de Rosario- Facultad de Cs. Exactas Ingenieria y Agrimensura)
PROBLEM SOLVING AND THE MATHEMATICAL LANGUAGE

Location: E: mint, Economical Building, room 4020

Group B – Session Chair: Guido Pinkernell
Presentations: Shuk-kwan Leung* (1), Ha-kping Tam (2)
(1: National Sun Yat-sen University; 2: National Taiwan Normal University)
A TEACHER EDUCATOR’S USE OF OWN TEACHING IN MATH PROBLEM POSING FOR TEACHERS (PARENTS) WORKSHOPS

Christine Choquet* (1), Magali Hersant (1), Laetitia Bueno-Ravel (2)
(1: University of Nantes; 2: University of Brest)
IS INQUIRY-BASED APPROACH POSSIBLE AT THE ELEMENTARY SCHOOL? A CASE STUDY

Aihui Peng* (1), Jing Li (2), Yanjie Li (3), Yueqiang Shang (1)
(1: Southwest University; 2: Lanfang Teacher College; 3: New Century School)
A VARIATION PERSPECTIVE ON TEACHING PROBLEM SOLVING IN CHINA

Lorena Salazar-Solórzano*
(Universidad de Costa Rica)
DEVELOPING THE COMPETENCE OF CREATING PROBLEMS IN FUTURE TEACHERS OF MATHEMATICS
Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: E: mint, Economical Building, room 4018

**Group A** – Session Chair: Peter Liljedahl
Presentations: José Antonio Fernández Bravo* (1), Juan Jesús Barbarán Sánchez (2), Ana Belén Montoro Medina (1)
(1: University Camilo José Cela; 2: University of Granada)
INVENT PROBLEMS: A WAY TO DEVELOP MATHEMATICAL COMPETENCE

Th. Gawlick*, Elisabeth Lucyga
(Leibniz Universität)
TYPES OF PLANS AS DEVELOPMENT STAGES OF PROBLEM SOLVING

Juan Jesús Barbarán Sánchez* (1), José Antonio Fernández Bravo (2), Ana Belén Montoro Medina (2)
(1: University of Granada; 2: University Camilo José Cela)
INFLUENCE OF INVENTION OF MATHEMATICAL PROBLEMS IN METACOGNITION

**Location: E: mint, Economical Building, room 4020**

**Group B** – Session Chair: Manuel Santos
Presentations: Rosana Nogueira de Lima*, Maria Elisa Esteves Lopes Galvão
(Universidade Anhanguera de São Paulo)
HOW TO DEVELOP RELATIONAL CALCULUS: A PROBLEM SOLVING APPROACH

Mustafa Serkan Pelen* (1), Perihan Dinç Artut (2)
(1: MEB; 2: Çukurova University)
AN INVESTIGATION OF MIDDLE SCHOOL STUDENTS’ ACHIEVEMENTS ON MISSING VALUE PROBLEMS

Mimi Park* (1), Kyeong-Hwa Lee (2)
(1: Gyeongin National University of Education; 2: Seoul National University)
TEACHING RELATIONAL STRUCTURE VIA MATHEMATICAL PROBLEM ANALOGY

Fourth Session: Friday, 29 July 2016, 16.30 – 18.00
Location: E: mint, Economical Building, room 4018

**Group A** – Session Chair: Manuel Santos
Presentations: Raja Herold-Blasius*, Benjamin Rott
(University of Duisburg-Essen)
STRATEGY KEYS AS KEY TO USE HEURISTICS – A QUALITATIVE STUDY WITH 3RD AND 4TH GRADERS

Anna-Christin Söhling*
(University of Münster)
THE ROLE OF ABDUCTION IN PROBLEM SOLVING

Soraia Prates*
(PUCPR)
TEACHING STRATEGIES FOR MATHEMATICAL PROBLEM SOLVING IN SCHOOL: STUDY GROUP WITH TEACHERS
Katherine Elizabeth Miller, David Bowers, Azin Sanjari*, Azita Manouchehri
(The Ohio State University)
PROBLEM SOLVING STRATEGIES OF PRE-SERVICE TEACHERS:
A GRADEBAND COMPARISON

Location: E: mint, Economical Building, room 4020

Group B – Session Chair: Guido Pinkernell
Presentations: Ana Kuzle*
(University of Potsdam)
DESIGN-BASED RESEARCH AS A FOUNDATION FOR SYSTEMATICAL AND MATERIAL BASED DEVELOPMENT OF PROBLEM SOLVING COMPETENCES

Claudia Vargas*
(Universidad de Santiago de Chile)
CRITICAL THINKING AND PROBLEM SOLVING

Eng Guan Tay, Tin Lam Toh, Foo Him Ho*, Pee Choon Toh, Yew Hoong Leong, Khiok Seng Quek, Jaguthsing Dindyal, Kim Hoo Hang
(National Institute of Education)
INFUSING MATHEMATICAL PROBLEM SOLVING INTO THE MATHEMATICS CURRICULUM: FEEDBACK FROM TEACHERS

Majid Haghverdi*
(Mathematics Department)
A STUDY OF THE EFFECT OF USING “MATHEMATICAN’S CHAIR AND SCHEMA” STRATEGY IN SOLVING WORD PROBLEMS IN MULTI-GRADES CLASS

TSG 21 – Mathematical applications and modelling in the teaching and learning of mathematics

Co-chairs: Jussara Araújo (Brazil), Gloria Stillman (Australia)
Team members: Morten Blomhøj (Denmark), Dominik Leiss (Germany), Toshikazu Ikeda (Japan)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: K: purple, Law Building, room 5+6

Group A – Session Chair: Morten Blomhøj
Presentations: Maike Hagena*
(Leuphana Universität Lüneburg)
THE INFLUENCE OF MATHEMATICS PRE-SERVICE TEACHERS’ MEASUREMENT SENSE ON WORKING ON COMPLEX MODELLING TASKS

Katrin Vorhöltter*, Lisa Rabe
(University of Hamburg)
CENTRAL TEACHER COMPETENCIES FOR SUPERVISING STUDENTS DURING MODELLING DAYS

Abolfazl Rafiepour*
(Shahid Bahonar University of Kerman)
THE ROLE OF MODELLING AND APPLICATION IN MATHEMATICS TEACHER EDUCATION PROGRAM IN IRAN
Raisa Guberman*, Marita Barabash, Dafna Mandler
(Achva Academic College)
ELEMENTARY SCHOOL MATH TEACHERS LEARN TO TEACH MODELS:
DARING TO LET GO OR GUIDING?

Location: K: purple, Law Building, room 15+16

Group B – Session Chair: Jussara Araújo
Presentations: JinHyeong Park* (1), Kyeong-Hwa Lee (2)
(1: Myongji University; 2: Seoul National University)
GENERALIZATION OF A MATHEMATICAL MODEL BY ABDUCTION:
THE CASE OF THE CHAIN RULE

Diana M. Fisher*
(Portland State University)
SYSTEM DYNAMICS MODELING CAN REORGANIZE ALGEBRAIC THINKING

Marita Barabash*, Raisa Guberman
(Achva Academic College)
DIDACTIC MODELS LEAD TO BIG IDEAS: AN EXAMPLE OF FRACTIONS

Mai Hirabayashi*
(University of Tsukuba)
ANALYSIS OF CHILDREN’S INTERPRETATION OF THE RESULTS IN MATHEMATICAL
MODELING: THE CASE OF DIVISIONS WITH REMAINDER

Location: K: purple, Law Building, room 17

Group C – Session Chair: Gloria Ann Stillman
Presentations: Talya Gilat*, Miriam Amit
(Ben-Gurion University of the Negev)
AUTHENTIC ASSESSMENT OF STUDENTS’ CREATIVE THINKING THROUGH MODEL
ELICITING ACTIVITIES

Martin Bracke* (1), Detlev Friedewold (2), Jörn Schnieder (3)
(1: University of Kaiserslautern; 2: Curriculum Institute Hamburg; 3: University of Lübeck)
TUTORING EXPLORATORY LEARNING AND PROBLEM SOLVING IN MATHEMATICAL
MODELLING – A TRAINING CONCEPT

Deike Susan Alfke*
(University of Hamburg)
MATHEMATICAL MODELLING WITH INCREMENTAL LEARNING AIDS – A VIDEO STUDY

Samira Mehraein*
(Ministry of Education)
SECONDARY SCHOOL STUDENTS’ ATTITUDE AND MATHEMATICAL
MODELLING ACTIVITIES
Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: K: purple, Law Building, room 5+6

Group A – Session Chair: Morten Blomhoj
Presentations: Masafumi Kaneko* (1), Akihiko Saeki (1), Daisuke Saito (2)
(1: Naruto University of Education; 2: Joto Junior High School)
THE ANALYSIS OF STUDENTS’ NOTION INVENTED BY PRESCRIPTIVE MODELLING IN PRE-SERVICE TEACHER EDUCATION

Carolina Guerrero-Ortiz*, Jaime Mena-Lorca
(Pontificia Universidad Católica de Valparaíso)
MODELLING IN TEACHER TRAINING

Mary Alice Carlson*, Elizabeth A. Burroughs, Elizabeth Fulton, Megan Wickstrom
(Montana State University)
TEACHERS’ USES OF THE TERM “MODEL” IN CLASSROOM SETTINGS

Issic Kui Chiu Leung* (1), Regina M. F. Wong (2)
(1: The Hong Kong Institute of Education; 2: Logos Academy)
PRE SERVICE TEACHERS’ KNOWLEDGE IN APPLYING STORY METAPHOR IN TEACHING MODELLING: AN EXAMPLE OF WEIGHTING AN ELEPHANT

Rogério Marques Ribeiro (1,2), Arthur Belford Powell* (2), Ademir Donizeti Caldeira (1)
(1: Universidade Federal de São Carlos; 2: Rutgers University – Newark)
MATHEMATICAL MODELING AND POSSIBLE ARTICULATION WITH MATHEMATICAL KNOWLEDGE FOR TEACHING

Location: K: purple, Law Building, room 15+16

Group B – Session Chair: Jussara Araújo
Presentations: Anna Alfieri*
(Liceo Scientifico “L. Siciliani” High School)
AN APPROACH TO MATHEMATICAL MODELS THROUGH DIGITAL STORYTELLING – AN EXAMPLE

Maria Giovanna Frassia*, Annarosa Serpe
(University of Calabria)
MATHEMATICAL MODELING AND GEOMETRY TEACHING IN A COMPUTER-BASED ENVIRONMENT: A CONCRETE EXAMPLE IN SECONDARY SCHOOL

Jonaki Ghosh* (Lady Shri Ram College for Women)
LEARNING MATHEMATICS THROUGH TECHNOLOGY ENABLED EXPLORATIONS

Jaqueline Maria da Silva* (1), Ana Carolina Carius (2), Marcela Martins Pereira (1), Deborah Faragó Jardim (1)
(1: UFVJM; 2: IFRJ)
TEACHING DERIVATIVES CONCEPTS WITH COMPUTATIONAL TECHNIQUES

Christian Spreitzer*
(Pädagogische Hochschule Niederösterreich)
MODELING A REAL PENDULUM WITH SMARTPHONE SENSOR TECHNOLOGY
Group C – Session Chair: Gloria Ann Stillman
Presentations: Funda Aydin-Guc* (1), Adnan Baki (2)
(1: Giresun University; 2: Karadeniz Technical University)
INTERPRETATION OF THE ROLE OF MATHEMATICAL MODELLING COMPETENCIES IN MODELLING PROCESS
Leon Poladian*
(University of Sydney)
USING JOURNAL ARTICLES IN TERTIARY MATHEMATICS UNITS ON MODELLING AND APPLICATIONS TO PROMOTE PRODUCTIVE DISPOSITIONS
Matti Heilio*
(Lappeentanta University of Technology)
ENCOURAGING STUDENTS’ CREATIVITY IN MODELLING COURSE EXERCISES
Ruth Rodriguez* (1), Diane M. Fisher (2)
(1: Tecnologic de Monterrey; 2: Portland State University)
THE VALUE OF SYSTEM DYNAMICS MODELING FOR TEACHING MATHEMATICS

Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: K: purple, Law Building, room 5+6
Group A – Session Chair: Toshikazu Ikeda
Presentations: Lisa Steffensen*, Ragnhild Hansen, Kjellrun Hiis Hauge
(Bergen University College (Høgskolen i Bergen))
CLIMATE CHANGE IN MATHEMATICS CLASSROOMS
Noboru Yoshimura* (1), Akira Yanagimoto (2)
(1: Tennoji J.H.S. attached Osaka-kyoiku university; 2: Kyoto University of Education)
OPEN-ENDED WORD PROBLEMS TOWARD MATHEMATICAL MODELLING IN JAPAN
Ginger Watson*, Mary Enderson
(Old Dominion University)
PRE-SERVICE STEM TEACHERS’ UNDERSTANDING, PRIOR EXPERIENCES, AND PREDICTED USE OF MODELING AND SIMULATION
Celil Ekici* (1), Cigdem Alagoz (2)
(1: University of the Virgin Islands; 2: University of the Virgin Islands)
COLLABORATIVE ACTION RESEARCH WITH STEM TEACHERS ON MATHEMATICAL MODELING OF WATER QUALITY

Location: K: purple, Law Building, room 15+16
Group B – Session Chair: Dominik Leiss
Presentations: María de las Mercedes Aravena Díaz*, Omar Godoy Arriagada, Ximena Colipán Uribe
(University Catholic of Maule)
GEOMETRIC MODELING BY STUDENTS FROM VULNERABLE SCHOOLS IN CHILE
Francisco Javier Camelo*
(University Distrital Francisco José de Caldas)
POLITICAL SUBJECTIVITY FROM MATHEMATICAL MODELLING
Irene Grafenhofer*, Vanessa Klöckner
(University of Koblenz)
MODELLING TASKS AS AN OPPORTUNITY FOR CONSTRUCTIVE DEALING WITH HETEROGENEITY

Kwan Eu Leong*, Jun You Tan
(University of Malaya)
MATHEMATICAL MODELLING SKILLS OF SECONDARY STUDENTS

Fourth Session: Friday, 29 July 2016, 16.30–18.00
Location: K: purple, Law Building, room 5+6

Group A – Session Chair: Toshikazu Ikeda
Presentations: Sibawu Witness Siyepu*
(Cape Peninsula University of Technology)
MATHEMATISING SOUTH AFRICAN TRAFFIC ROAD SIGNS

Kosuke Mineno*
(Setagaya Junior High School affiliated with Tokyo Gakugei University)
THE ROLES OF GENERATING AND CHOOSING VARIABLES IN DATA-ORIENTED MODELLING: THE CASE OF CHERRY BLOSSOM

Elizabeth Sebastian*, Santiagu Theresa
(Auxiliun College)
STABILITY ANALYSIS IN THE EDUCATIONAL SYSTEM USING DIFFERENCE EQUATIONS

Ayse Tekin Dede*, Esra Bukova Guzel
(Dokuz Eylul University)
HOW TO INTEGRATE MATHEMATICAL MODELLING INTO MATHEMATICS COURSES: A GUIDE SUGGESTION

Location: K: purple, Law Building, room 15+16

Group B – Session Chair: Dominik Leiss
Presentations: Takehiro Kihira* (1), Toshihiko Chikusa (2), Tetsushi Kawasaki (3)
(1: Kyoto Municipal Murasakino High School; 2: Kyoto Prefectural Junior High School affiliated With Rakuhoku Senior High School; 3: Gifu University)
DEVELOPMENT OF TEACHING MATERIALS FOR FOSTERING COGNITIVE ABILITY OF SPACE IN JAPANESE HIGH SCHOOLS

Makbule Gozde Didis* (1), Sinem Bas Ader (2), Erdinc Cakiroglu (3), Ayhan Kursat Erbas (3), Bulent Cetinkaya (3), Cengiz Alacaci (4)
(1: Gaziosmanpasa University; 2: Istanbul Aydin University; 3: Middle East Technical University; 4: Istanbul Medeniyet University)
RESEARCHERS’ EXPERIENCE OF DEVELOPING MATHEMATICAL MODELING TASKS FOR SECONDARY LEVELS

Marco Aurélio Kistemann Jr.* (1), Neil da Rocha Canedo Jr. (2)
(1: UFJF; 2: PJF)
INTRODUCING MATHEMATICS MODELLING IN A BASIC EDUCATION SIXTH GRADE CLASS
Djordje M. Kadijevich*
(Institute for Educational Research)
DATA MODELING IN K-12–16 EDUCATION

TSG 22 – Interdisciplinary mathematics education
Co-chairs: Susie Groves (Australia), Julian Williams (UK)
Team members: Rita Borromeo-Ferri (Germany), Brian Doig (Australia), Nicholas Mousoulides (Cyprus)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: E: mint, Economical Building, room 3027
Session Chair: Brian Doig
Presentations: Atara Shriki* (1), Ilana Lavy (2)
(1: Oranim Academic College of Education; 2: The Max Stern Yezreel Valley College)
MATHEMATICS AND SCIENCES TEACHERS COLLABORATIVELY DESIGN INTERDISCIPLINARY LESSON PLANS: BENEFITS, LIMITATIONS, CONCER

Mutfried Hartmann* (1), Thomas Borys (1), Arno Bayer (2), Tetsushi Kawasaki (3)
(1: PH-Karlsruhe; 2: Universidade de Luterana do Brasil; 3: Gifu University)
TEACHING AND APPLYING RESEARCH METHODS IN A CROSS-CULTURAL PROJECT FOR STUDENTS OF MATHEMATICS EDUCATION

Sikunder Ali Baber*
(University College Buskerud and Vestfold Norway)
DOING INTERDISCIPLINARY WORK IN MATHEMATICS EDUCATION: POTENTIALITIES AND CHALLENGES

Maite Gorriz*, Santi Vilches
(INS Arquitecte Manuel Raspall)
INTERDISCIPLINARY ACTIVITIES IN CONTEXT

Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: E: mint, Economical Building, room 3027
Session Chair: Rita Borromeo-Ferri
Presentations: Nenad Radakovic* (1), Limin Jao (2), Susan Jagger (3)
(1: College of Charleston; 2: McGill University; 3: Ryerson University)
INVESTIGATING INTERDISCIPLINARY APPROACHES AND COMMITMENTS THROUGH PRE-SERVICE TEACHERS’ USE OF MATHEMATICS AND POETRY

Gloria Angélica Moreno Durazo*, Ricardo Cantoral
(Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional)
MATHEMATICS AND MEDICINE: A STUDY OF THINKING AND VARIATIONAL LANGUAGE

Frederick Lim Uy*
(CSULA)
INCORPORATING MATHEMATICS, CREATIVE WRITING, LITERATURE AND ARTS IN THE CLASSROOM
Betul Yeniterzi*, Cigdem Haser, Mine Isiksal-Bostan
(Middle East Technical University)
TEACHERS’ READINESS TO MATHEMATICS AND SCIENCE INTEGRATION

Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: E: mint, Economical Building, room 3027

Session Chair: Susie Groves
Presentations: Roberto Araya*
(University of Chile)
A CLOUD BASED PERFORMANCE SUPPORT SYSTEM FOR TEACHING STEM
WITH HANDS-ON MODELING

Jong-Eun Moon*, Mi-Yeong Park, Jeong Soo-Yong, Mi-Kyung Ju
(Hanyang University)
KOREAN MATHEMATICS TEXTBOOK ANALYSIS: FOCUSING ON COMPETENCE,
ON CONTEXTS AND WAYS OF INTEGRATION

Francesco Scerbo*, Elena Scordo, Laura Vero
(Liceo Scientifico “L. Siciliani” – Catanzaro – 88100)
MATHEMATICS OF MONEY DYNAMICS

Signe E. Kastberg* (1), Rachel Long (2), Kathleen Lynch-Davis (3), Beatriz S. D’Ambrosio (4)
(1: Purdue University; 2: Central elementary school; 3: Appalachian state university; 4: Miami university)
TRANSCENDING THE MATHEMATICS CLASSROOM

Fourth Session: Friday, 29 July 2016, 16.30 – 18.00
Location: E: mint, Economical Building, room 3027

Session Chair: Nicholas Mousoulides
Presentations: Carlos Alfonso Lopez Leiva*, Marios Pattichis, Sylvia Celedon-Pattichis
(University of New Mexico)
INTEGRATING MATHEMATICS, ENGINEERING AND TECHNOLOGY THROUGH
MATHEMATICS MODELING AND VIDEO REPRESENTATIONS

OhNam Kwon (1), JungSook Park (2), JeeHyun Park (3), Jaehee Park (4), Changsuk Lee* (5)
(1: Seoul National University; 2: Yang-Jae High School; 3: Ban-po High School;
4: Gyeong-gi Science High School for the Gifted; 5: Jang-gok High School)
AN EXPERIMENTAL TEXTBOOK SYSTEM FOR FINANCIAL MATHEMATICS FOR
THE INTEGRATION OF FINANCE AND MATHEMATICS

Maria Rita Otero* (1,2), Vivianna Carolina Llanos (1,2), Maria Paz Gazzola (1,2), Marcelo Arlego (1,2)
(1: Universidad Nacional del Centro de la Provincia de Buenos Aires;
2: Consejo Nacional de Investigaciones Científicas y Tecnológicas)
CO-DISCIPLINARY MATHEMATICS AND PHYSICS RESEARCH AND STUDY
 COURSE (RSC) IN THE SECONDARY SCHOOL AND THE UNIVERSITY

Diarmuid Aidan Hyland*, Paul van Kampen, Brian Nolan
(Dublin City University)
INVESTIGATING STUDENTS’ DIFFICULTIES WITH DIFFERENTIAL
EQUATIONS IN PHYSICS.
TSG 23 – Mathematical literacy

Co-chairs: Iddo Gal (Israel), Hamsa Venkat (SA)
Team members: Vince Geiger (Australia), Eva Jablonka (UK), Markus Helmerich (Germany)

Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: H: orange, Educational Building, room 207

Group A – Session Chairs: Vince Geiger, Markus Alexander Helmerich
Presentations: Terence Dawson*, Stella Dudzic, Stephen Lee (MEI)
DEVELOPING NEW QUANTITATIVE REASONING AND QUANTITATIVE PROBLEM SOLVING QUALIFICATIONS WITH POST 16 STUDENTS

Brenda Reche Graff* (1), Ronaldo Barros Ripardo (2)
(1: UNIFESSPA; 2: UNIFESSPA)
THEORIES ABOUT MATHEMATICAL LITERACY: A THEORETICAL STUDY

Mustafa Çağrı Gürbüz*, Murat Altun
(Uluda University)
DEVELOPMENT AND EVALUATION OF MATHEMATICAL LITERACY COURSE FOR PRE SERVICE TEACHERS

Location: H: orange, Educational Building, room 208

Group B – Session Chair: Eva Jablonka
Presentations: Maryam Mohsenpour (1), Zahra Gooya* (2)
(1: Alzahra University; 2: Shahid Beheshti University)
ASSESSING IRANIAN STUDENTS’ MATHEMATICS LITERACY COMPETENCIES BASED ON PISA STUDIES

Tatag Yuli Eko Siswono*
(The State University of Surabaya)
HOW MATHEMATICALLY LITERATE ARE SECONDARY TEACHERS IN PERFORMING CONTEXT-BASED PROBLEM SOLVING TASK?: A CASE OF INDONESIA

Luxizi Zhang*
(East China Normal University)
SHANGHAI SIXTH GRADE STUDENTS’ PERFORMANCE ON NUMBER SENSE – A CASE STUDY
TSG 24 – History of the teaching and learning of mathematics

Co-chairs: Fulvia Furinghetti (Italy), Alexander Karp (USA)
Team members: Henrike Allmendinger (Germany), Johan Prytz (Sweden), Harm Jan Smid (Netherlands)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: K: purple, Law Building, room 12

Session Chair: Fulvia Furinghetti
Presentations: Guenter Graumann*
(University of Bielefeld)
CONCEPTIONS OF ARITHMETIC EDUCATION IN GERMANY FROM A HISTORICAL PERSPECTIVE

María José Madrid* (1), Alexander Maz-Machado (1), Carmen León-Mantero (1), Carmen López (2)
(1: Universidad de Córdoba; 2: Universidad de Salamanca)
THE STUDY OF PRACTICE ARITHMETIC IN SPAIN DURING THE SIXTEENTH CENTURY

Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: K: purple, Law Building, room 12

Session Chair: Henrike Allmendinger
Presentations: Eisso Johannes Atzema*
(University of Maine)
PROVING THE CONVERSE OF PTOLEMY’S THEOREM: A CASE STUDY ON GEOMETRICAL RESEARCH IN THE FIRST HALF OF THE 19TH CENTURY

Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: K: purple, Law Building, room 12

Session Chair: Henrike Allmendinger
Presentations: Eisso Johannes Atzema*
(University of Maine)
PROVING THE CONVERSE OF PTOLEMY’S THEOREM: A CASE STUDY ON GEOMETRICAL RESEARCH IN THE FIRST HALF OF THE 19TH CENTURY

Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: K: purple, Law Building, room 12

Session Chair: Henrike Allmendinger
Presentations: Eisso Johannes Atzema*
(University of Maine)
PROVING THE CONVERSE OF PTOLEMY’S THEOREM: A CASE STUDY ON GEOMETRICAL RESEARCH IN THE FIRST HALF OF THE 19TH CENTURY

Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: K: purple, Law Building, room 12

Session Chair: Henrike Allmendinger
Presentations: Eisso Johannes Atzema*
(University of Maine)
PROVING THE CONVERSE OF PTOLEMY’S THEOREM: A CASE STUDY ON GEOMETRICAL RESEARCH IN THE FIRST HALF OF THE 19TH CENTURY

Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: K: purple, Law Building, room 12

Session Chair: Henrike Allmendinger
Presentations: Eisso Johannes Atzema*
(University of Maine)
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PROVING THE CONVERSE OF PTOLEMY’S THEOREM: A CASE STUDY ON GEOMETRICAL RESEARCH IN THE FIRST HALF OF THE 19TH CENTURY
Marvin Roberto Mendoza* (1), Luis Armando Ramos (2)
(1: National Autonomous University of Honduras;
2: Francisco Morazán National Pedagogical University)
TEACHING MATHEMATICS IN HONDURAS: ORIGINS, DEVELOPMENT,
AND CHALLENGES

Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: K: purple, Law Building, room 12

Session Chair: Harm Jan Smid
Presentations: Nicola M. R. Oswald* (1, 2), Nadine Benstein (1)
(1: University of Wuppertal; 2: Würzburg University)
COMBINING CONCEPT MAPS AND NETWORK MAPS TO VISUALIZE HISTORY
OF MATHEMATICS – CASE STUDY ON WALther lietaZMANN

Zohre Ketabdar* (1), Maryam Ketabdar (2)
(1: Science and research university of Tehran; 2: Roshangar secondary school)
AN OVERVIEW OF THE HISTORY OF TEACHER TRAINING IN IRAN

TSG 25 – The Role of History of Mathematics in Mathematics Education

Co-chairs: Costas Tzanakis (Greece), Xiaqin Wang (China)
Team members: Kathleen Clark (USA), Tinne Hoff Kjeldsen (Denmark), Sebastian Schorcht (Germany)

First Session: Tuesday, 26 July 2016, 15.00 – 16.00
Location: E: mint, Economical Building, room 0080

Session Chair: David Guillemette
Presentations: Charlotte De Varent*
(ERC SAW CNRS PARIS 7 DIDEROT)
CONSEQUENCES OF THE USE OF AN ANCIENT MATHEMATICAL
TABLET IN THE CLASSROOM

Panagiota Kotarinou* (1), Charoula Statthopolou (2), Eleni Gana (2)
(1: School of Arts of Geraka; 2: University of Thessaly)
EXPANDING CONTEXTS FOR TEACHING UPPER SECONDARY SCHOOL GEOMETRY

Yanjun Hong*
(East China Normal University)
TEACHING MATHEMATICS FROM THE PERSPECTIVE OF HPM: PROCESS AND MODEL

Second Session: Tuesday, 26 July 2016, 16.30 – 18.00
Location: E: mint, Economical Building, room 0080

Session Chairs: Susanne Spies, Sebastian Schorcht
Presentations: Wei Beng Poh* (1), Jaguthsing Dindyal* (2)
(1: MOE Singapore; 2: National Institute of Education Singapore;
2: National Institute of Education Singapore)
A HISTORICAL PERSPECTIVE FOR TEACHING CALCULUS:
THE DEVELOPMENT OF A LESSON PACKAGE
Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: E: mint, Economical Building, room 0080

Session Chair: Snezana Lawrence
Presentations: Gülçin Tan-Sisman, Büsra Kirez*
(Hacettepe University)
HISTORY OF MATHEMATICS IN THE TURKISH MIDDLE SCHOOL MATHEMATICS CURRICULUM AND TEXTBOOKS

Monserrat Rodríguez Vásquez*, Jesús Romero Valencia
(Universidad Autónoma de Guerrero)
HISTORY OF MATHEMATICS IN THE CLASSROOM: ALGORITHM OF THE ADDITION AND SUBTRACTION

ChunYan Qi*
(East China Normal University)
RESEARCH ON THE PROBLEM POSING OF THE HPM

Barbara Schmidt-Thieme* (1), Tanja Hamann (2)
(1: Universität Hildesheim; 2: Universität Hildesheim)
A CURRICULUM FOR HISTORY OF MATHEMATICS IN PRE-SERVICE TEACHER EDUCATION
Fourth Session: Friday, 29 July 2016, 16.30–18.00
Location: E: mint, Economical Building, room 0080

Session Chairs: Patricia Baggett, Kathrein Ysette Weiss-Pidstrygach
Presentations: Ke Wang (2), Jiachen Zou* (1)
(1: East China Normal University; 2: Texas A&M University)
THE MODEL OF TEACHERS’ PROFESSIONAL DEVELOPMENT ON INTEGRATING
THE HISTORY OF MATHEMATICS INTO TEACHING IN SHANGHAI

ZhongYu Shen*
(East China Normal University)
TEACHING OF APPLICATION OF CONGRUENT TRIANGLES FROM
THE PERSPECTIVE OF HPM

Fabían Wilfrido Romero Fonseca*, Rosa María Farfán Márquez
(Center for Research and Advanced Studies of the National Polytechnic Institute)
THE SOCIOEPISTEMOLOGIC APPROACH TO THE DIDACTIC PHENOMENON:
AN EXAMPLE

Thomas Krohn* (1), Karin Richter (2)
(1: University of Leipzig; 2: Martin-Luther-University of Halle-Wittenberg)
AUTHENTIC & HISTORIC ASTRONOMICAL DATA MEET NEW MEDIA IN
MATHEMATICS EDUCATION

Slim Mrabet*
(Tunisia)
THE DEVELOPMENT OF THALES THEOREM THROUGHOUT HISTORY

TSG 26 – Research on teaching and classroom practice

Co-chairs: Yoshinori Shimizu (Japan), Mary Kay Stein (USA)
Team members: Birgit Brandt (Germany), Helia Oliveira (Portugal), Lijun Ye (China)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: H: orange, Educational Building, room 213

Group A – Session Chair: Mary Kay Stein
Presentations: Dae Hong*
(University of Iowa)
MAINTAINING COGNITIVE DEMAND DURING LIMIT LESSONS:
A CHALLENGING CLASS PRACTICE

Weiping Zhang*
(Shanghai Normal University)
ELABORATING ON RELATIONSHIP BETWEEN INSTRUCTION SETUP AND
STUDENTS’ OPPORTUNITY TO LEARN IN CHINESE CLASS

Martha Leticia García Rodríguez* (1), Isaías Miranda Viramontes (2)
(1: Instituto Politécnico Nacional; 2: Instituto Politécnico Nacional)
INCREASING THE COGNITIVE DEMAND OF A VECTORIAL FUNCTION TASK VIA
THE INSTRUCTOR-STUDENTS INTERACTION
Oral Communications

Talli Nachlieli*, Yafim Katz  
(Levinsky College of Education)  
TEACHING PRACTICES THAT PROMOTE PARTICIPATION WHILE SOLVING HIGH COGNITIVE DEMANDING TASKS

Location: H: orange, Educational Building, room 20

Group B – Session Chair: Yoshinori Shimizu  
Presentations: Hüseyin Özdemir*  
(Bursa Hürriyet Vocational and Technical High School)  
TEACHERS' BELIEFS AND CLASSROOM PRACTICES VERSUS STUDENTS' PERCEPTIONS FOR MATHEMATICS INSTRUCTION: TURKISH CASE

Binod Prasad Pant*, Bal Chandra Luitel  
(Kathmandu University)  
BELIEFS ABOUT THE NATURE OF MATHEMATICS AND ITS PEDAGOGICAL INFLUENCES

Natcha Kamol*  
(Chiang Mai University)  
THAI MIDDLE SCHOOL STUDENTS’ VALUE IN AN EFFECTIVE MATHEMATICS LESSON: THREE CASE STUDIES

Shintia Revina*, Frederick Leung  
(The University of Hong Kong)  
INFLUENCE OF CULTURES IN THE IMPLEMENTATION OF REALISTIC MATHEMATICS EDUCATION: A PRELIMINARY FINDINGS

Location: H: orange, Educational Building, room 21

Group C – Session Chair: Birgit Brandt  
Presentations: Jae Ki Lee* (1), Susan Licwinko (2), Nicole Taylor-Buckner (3)  
(1: Borough of Manhattan Community College; 2: Borough of Manhattan Community college; 3: Borough of Manhattan Community College)  
ACCESSING A CONCEPTUAL APPROACH OF RATIONAL NUMBERS

Aytug Ozaltun Celik* (1), Esra Bukova Güzel (2)  
(1: Pamukkale University; 2: Dokuz Eylül University)  
REVEALING OZGUR'S THOUGHTS OF A QUADRATIC FUNCTION WITH A CLINICAL INTERVIEW: CONCEPTS AND THEIR UNDERLYING REASONS

Eugenia Marmolejo*  
(Universidad Nacional Autónoma de México)  
SOLVING RADICAL EQUATIONS: IDENTIFYING THE CORRECT SOLUTIONS

Rok Lipnik*  
(Gimnazija Celje – Center)  
MATHS HOMEWORK AND GRADES – ARE THEY CORRELATED?
Second Session: Tuesday, 26 July 2016, 16.30–18.00  
Location: H: orange, Educational Building, room 213

**Group A** – Session Chair: Helia Oliveira  
Presentations: Edyta Nowinska* (1,2)  
(1: University of Osnabrueck; 2: Adam Mickiewicz University od Poznan)  
RATING SYSTEM FOR ANALYZING AND ASSESSING A METACOGNITIVE-DISCURSIVE QUALITY OF MATHS LESSONS

Carmel Mesiti*, David Clarke  
(The University of Melbourne)  
THE LEXICON PROJECT: DOCUMENTING AUSTRALIA’S PEDAGOGICAL NAMING SYSTEM & COMPARING IT WITH OTHERS FROM AROUND THE WORLD

Christine Suurtamm, Richard Barwell, Brenna Quigley*  
(University of Ottawa)  
I SAW THAT TOO: MUTUAL RECOGNITION IN RESEARCHERS OBSERVING TEACHERS OBSERVING MATHEMATICS TEACHING

Mark Hoover*, Minsung Kwon, Deborah Loewenberg Ball  
(University of Michigan)  
DEVELOPING METHOD FOR STUDYING THE WORK OF TEACHING

Zelha Tunc Pekkan*, R. Didem Taylan, Bengi Birgili, Utkun Aydin, Mustafa Özcan  
(MEF University)  
ACADEMIANS AS TEACHERS: NURTURING TEACHING EXPERIENCE

Sharon Strickland* (1), Amanda Milewski (2)  
(1: Texas State University; 2: University of Michigan)  
(TOWARD) A FUNCTIONAL FRAMEWORK FOR DESCRIBING TEACHERS’ PRACTICES OF REACTING

**Group B** – Session Chair: Liyun Ye  
Presentations: Hui-chuan Li* (1), Andreas Stylianides (2)  
(1: Universiti Brunei Darussalam; 2: University of Cambridge)  
THE ROLES OF TEACHER AND STUDENTS DURING A PROBLEM-BASED LEARNING INTERVENTION

Su Liang*  
(California State University)  
INTEGRATING TEACHING RESEARCH WITH CLASSROOM PRACTICE

Binyan Xu, Guangtian Zhu*  
(East China Normal University)  
CHINESE STUDENTS’ ACHIEVEMENTS IN THE PROJECT-BASED CLASSROOM PRACTICE OF STATISTICS

Tika Ram Pokhrel*  
(Kathmandu University)  
ACTIVITY BASED MATHEMATICS INSTRUCTION: EXPERIENCES IN ADDRESSING THE 21ST CENTURY SKILLS
DISCUSSING TEACHING MATHEMATICS THROUGH VIDEO-RECORDED LESSONS: WHAT QUEBEC TEACHERS SAY ABOUT INQUIRY-BASED LEARNING

**Location:** H: orange, Educational Building, room 21

**Group C** – Session Chair: Mary Kay Stein
Presentations: Verónica Ester Parra* (1,2), María Rita Otero (1,2)
(1: Universidad Nacional del Centro de la Provincia de Buenos Aires (UNCPBA); 2: Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET).)
RESEARCH ON TEACHING AND CLASSROOM PRACTICE: PERFORMING A RESEARCH AND STUDY COURSE IN THE SECONDARY LEVEL

Tuula Maunula*
(University of Gothenburg)
IS Y = 6X A POINT OR A LINE? LEARNER CONTRIBUTIONS IN MATHEMATICS LESSONS

Fiona Mary McDiarmid*
(Cognition Education)
HOW DO TEACHERS USE RESEARCH IN AN INQUIRY STANCE

Elaine Simmt*
(University of Alberta)
INTERPRETING TEACHER COMMENTS ABOUT TEACHING: UNDERSTANDING PEDAGOGY

**Third Session: Friday, 29 July 2016, 15.00 – 16.00**

**Location:** H: orange, Educational Building, room 213

**Group A** – Session Chair: Yoshinori Shimizu
Presentations: Nympha Afaible Beltran-Joaquin*
(University of the Philippines)
DEVELOPING PROBLEM-SOLVING SKILLS THROUGH CO-GENERATIVE PEER TEACHING

Lu Pien Cheng*
(National Institute of Education)
THE USE OF FLIPPED CLASSROOM IN THE SINGAPORE PRIMARY MATHEMATICS CLASSROOM

Wai Pong Au Yeung*
(Caritas Yuen Long Chan Chun Ha Secondary School)
THE INFLUENCE OF FLIPPED CLASSROOM INSTRUCTION ON STUDENTS’ UNDERSTANDING AND PERFORMANCE IN SOLVING QUADRATIC EQUATIONS

Betina Duarte* (1), Analia Bergé (2)
(1: Universidad Pedagógica; 2: Université du Québec à Rimouski)
GENERATING AND VALIDATING CONJECTURES: CONDITIONS AND ALTERNATIVES FOR CLASS MANAGEMENT
Group B – Session Chair: Birgit Brandt
Presentations: Jihyun Hwang*, Dae S. Hong, Kyong Mi Choi
(University of Iowa)

USE OF INSTRUCTIONAL EXAMPLES IN CALCULUS CLASSROOMS

Ramazan Avcu* (1), Çigdem Haser (2)
(1: Aksaray University; 2: Middle East Technical University)

EXAMPLES THAT MIRROR MIDDLE SCHOOL MATHEMATICS TEACHERS’ CLASSROOM PRACTICES ABOUT ORDERING RATIONAL NUMBERS

Valeska Valentina Grau, David Daniel Preiss, María Elisa Calcagni*
(Pontificia Universidad Católica de Chile)

HOW DO CHILEAN PRE-SERVICE AND IN-SERVICE TEACHERS PERCEIVE TEACHING STRATEGIES THAT FOSTER METACOGNITION

Nan Zhang* (1), Yeping Li (2), Guangming Wang (1)
(1: Tianjin Normal University; 2: Texas A&M University)

VIDEO-BASED RESEARCH ON TEACHING BEHAVIOR IN TECHNOLOGY-RICH MATHEMATICS CLASSROOM IN CHINA

Group C – Session Chair: Helia Oliveira
Presentations: Anna Marie Conner* (1), Laura M. Singletary (2)
(1: University of Georgia; 2: Lee University)

IN SEARCH OF PRODUCTIVE ARGUMENTATION: AN EXPLORATORY EXAMINATION OF TWO CLASSROOMS

Colleen M. Eddy* (1), Sarah Pratt (1), Sampan Thinwiangthong (2), Wipaporn Suttiamporn (2), Trena Wilkerson (3), Gabriel Matney (4), Jensamut Saengpun (5), Anake Sudejamnong (6), Kasem Premprayoon (7)
(1: University of North Texas; 2: KhonKaen University; 3: Baylor University; 4: Bowling Green State University; 5: Chiang Mai University; 6: Suratthani Rajabhat University; 7: Thaksin University)

COMMON OBSERVATION TOOL FOR MATH TEACHER’S USE OF FORMATIVE ASSESSMENT IN THE U.S. AND THAILAND

Sarah Pratt* (1), Colleen Eddy (1), Gabriel Matney (2), Trena Wilkerson (3), Mairtiree Inprasitha (4), Narumol Inprasitha (4), Somkuan Srichompoo (4), Narumon Changsri (4), Thanya Kadroon (5), Pimlak Moonpoo (6)
(1: University of North Texas; 2: Bowling Green State University; 3: Baylor University; 4: KhonKaen University; 5: Suratthani Rajabhat University; 6: Valaya Alongkorn Rajabhat University)

FACILITATING TEACHERS’ INSTRUCTION TO ELICIT STUDENT PROCESSES IN THINKING OF MATHEMATICS
Fourth Session: Friday, 29 July 2016, 16.30–18.00
Location: H: orange, Educational Building, room 213

Group A – Session Chair: Liyun Ye
Presentations: Justin Davis Valentin* (University of Seychelles)
CLASSROOM REFORM IN SMALL DEVELOPING STATES: THE CASE OF THE MATHEMATICS LESSON STRUCTURE IN THE SEYCHELLES
Wei Sun*, Xuefeng Li (Towson University)
A COMPARATIVE ANALYSIS OF TEACHING PRACTICE IN SHANGHAI, CHINA
Hui Min Chia*, Chap Sam Lim (UNIVERSITI SAINS MALAYSIA)
COMPARING THE TEACHING AND CLASSROOM PRACTICES OF TWO PRIMARY MATHEMATICS RESEARCH LESSONS ON THE SAME TOPIC WHOLE NUMBE
Fang Liang*, Xiaotian Sun (Minzu University of China)
CASE STUDY ON JUNIOR MATHEMATICS CLASSROOM TEACHING IN MINORITY AREAS
Sousada Chidthachack* (1), Forster D. Ntow (2), Emmanuel A. Bofah (3) (1: University of Minnesota; 2: University of Cape Coast; 3: University of of Helsinki)
TEACHING FOR CONCEPTUAL UNDERSTANDING AND MATHEMATICS ACHIEVEMENT IN AN AFRICAN COMPARATIVE CONTEXT

Location: H: orange, Educational Building, room 20

Group B – Session Chair: Mary Kay Stein
Presentations: Debra Lynn Plowman* (The University of Texas)
TEACHERS’ NOTICING OF AND RESPONSES TO STRUGGLING STUDENTS
Anna-Marietha Vogler* (TU Dortmund)
NO NEED TO FOCUS INTERACTIONS? WHAT THE CONSTRUCT OF NOTICING SHOWS ABOUT TEACHERS’ SUPPORTS IN MATHEMATICS CLASSROOM
Duncan Mhakure* (University of Cape Town)
MATHEMATICS TEACHER NOTICING THROUGH THE LENS OF PRODUCTIVE QUESTIONING
Lindsey Mann* (University of Michigan)
HANDING OFF THE MATHEMATICAL WORK TO STUDENTS: A DECOMPOSITION OF TEACHING PRACTICE
Summer Bateiha*, Ryad Ghanam, Zeyad Bateiha (Virginia Commonwealth University in Qatar)
MATHEMATICAL GROWTH THROUGH ERROR
Location: H: orange, Educational Building, room 21

Group C – Session Chair: Yoshinori Shimizu
Presentations: Eva Tsz Wai Lam*
(True Light Middle of Hong Kong)
STUDYING TEACHERS’ USE OF METAPHORS IN THE CONTEXT OF DIRECTED NUMBERS

Isabel Velez*
(Instituto de Educação – Universidade de Lisboa)
TEACHERS’ ACTIONS REGARDING GRADE 3 STUDENTS’ REPRESENTATIONS

Alison Mary Goss*
(University of Ottawa)
MONTESSORI TEACHERS’ EXPERIENCES TEACHING FRACTIONS WITH MANIPULATIVES

Immaculate Kizito Namukasa*
(The university of western ontario)
TEACHING PRACTICES IN THE MONTESSORI SYSTEM

Paola Carante*, Ornella Robutti
(Università di Torino)
MERLO ITEMS FOR EXPLORING AND DISCUSSING ABOUT MATHEMATICAL MEANINGS

TSG 27 – Learning and cognition in mathematics

Co-chairs: Wim van Dooren (Belgium), Gaye Williams (Australia)
Team members: Pablo Dartnell (Chile), Anke Lindmeier (Germany), Jérôme Proulx (Canada)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: I: blue, Philosophical Tower, room 772

Session Chairs: Wim van Dooren, Anke Lindmeier
Presentations: Samantha Sarah Morrison*, Hamsa Venkatakrishnan
(University of the Witwatersrand)
MANAGING TENSIONS BETWEEN DIAGNOSTIC ASSESSMENT AND SUGGESTED FOLLOW-UP TEACHING PATHWAYS

Amir Hossein Ashna*, Samaneh Sahebzamani
(Refah University Collge)
COGNITIVE SUBTYPES OF MATHEMATICS LEARNING DIFFICULTIES IN PRIMARY EDUCATION

Jinyu Zhang*
(East China Normal University)
PROCEDURAL KNOWLEDGE DEVELOPMENT MODEL IN CHINESE AND GERMAN CLASSROOMS – THEORETICAL REFLECTIONS AND A CASE STUDY

Patricia Lamadrid*, Marta E. Valdemoros
(CINVESTAV)
REFLECTION ON DIDACTIC DESIGN FOR THE TEACHING OF NATURAL NUMBER
Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: I: blue, Philosophical Tower, room 772

Session Chairs: Wim van Dooren, Gaye Williams
Presentations: Ryan Ziols*, Perceval Matthews (University of Wisconsin-Madison)
BEYOND COMPARISON AND COUNTING: WHAT A “SENSE OF PROPORTION” MIGHT MEAN FOR MATHEMATICS EDUCATION

Caroline Long* (University of Pretoria)
LEARNING PATHWAYS WITHIN THE MULTIPLICATIVE CONCEPTUAL FIELD: INSIGHTS REFLECTED THROUGH A RASCH MEASUREMENT FRAMEWORK

Kazuya Kageyama* (Hiroshima University)
WHAT ARE THE DRIVING FORCES TO HAVE STUDENTS NOTICE MATHEMATICALLY?

Thorsten Scheiner (1), Márcia M. F. Pinto* (2)
(1: University of Hamburg; 2: Federal University of Rio de Janeiro)
ABSTRACTION IN MATHEMATICS: TAKING ACCOUNT FOR THE INCREASING COMPLEXITY AND CONTEXT-SENSITIVITY OF THE KNOWLEDGE SYSTEM

Marta Elena Valdemoros Álvarez*, Patricia Lamadrid, Mercedes Ramírez (CINVESTAV)
THE FUTURE TEACHER, MULTIPLICATION AND DIVISION OF FRACTIONS

Third Session: Friday, 29 July 2016, 15.00–16.00
Location: I: blue, Philosophical Tower, room 772

Session Chairs: Gaye Williams, Jérôme Proulx
Presentations: Stella Pede* (1), Rita Borromeo-Ferri (1), Frank Lipowsky (2), Julia Schwabe (2), Natascha Schupp (2)
(1: Institute of Mathematics; 2: Institute of Humanities)
DESIRABLE DIFFICULTIES IN MATHEMATICS USING INTERLEAVING PRACTICES

Dragan Trninic* (Nanyang Technological University)
THE EDUCATIONAL ROLE OF PRACTICE

Sebastian Kollhoff* (Bielefeld University)
ANALYZING PROCESSES OF TRANSFER IN STUDENT INTERACTION

Carol Carruthers* (Seneca College)
CAN THE AFFORDANCES OF TECHNOLOGY USED IN A FOUNDATIONAL COURSE GIVE INSIGHT INTO HOW MATHEMATICS IS LEARNED IN COLLEGE?
Fourth Session: Friday, 29 July 2016, 16.30–18.00
Location: I: blue, Philosophical Tower, room 772

Session Chairs: Gaye Williams, Pablo Dartnell
Presentations: José Antonio Juárez López* (1), José Gabriel Sánchez Ruiz (2), Lidia Aurora Hernández Rebollar (1), Josip Sisko Ignjatov (1)
(1: Benemérita Universidad Autónoma de Puebla; 2: Universidad Nacional Autónoma de México)

LEVELS OF COHERENCE IN THE SITUATION MODEL CONSTRUCTION OF A WORD PROBLEM

Guangming Wang*, Wenjuan She, Nan Zhang
(Tianjin Normal University)

A RESEARCH ON METACOGNITIVE CHARACTERISTICS OF HIGHLY EFFECTIVE MATHEMATICS LEARNERS IN HIGH SCHOOL IN CHINA

Karen G. Skilling* (1), Gabriel J. Stylianides (2)
(1: King’s College London; 2: University of Oxford)

TEACHERS’ VIEWS ABOUT COGNITIVE ENGAGEMENT IN MATHEMATICS FOR DIFFERENT GROUPS OF STUDENTS

TSG 28 – Affect, beliefs and identity in mathematics education

Co-chairs: Markku Hannula (Finland), Francesca Morselli (Italy)
Team members: Emine Erktin (Turkey), Maike Vollstedt (Germany), Qiao-Ping Zhang (Hong Kong)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: B: dark-brown, East Wing Building, room 222

Group A – Session Chair: Emine Erktin
Presentations: Gayanthi Malika Wadanambi* (1), Frederick K. S. Leung (2)
(1: Ruhuna National College of Education; 2: The University of Hong Kong)
SRI LANKA’S PRE-SERVICE TEACHERS’ PROFESSED BELIEFS ABOUT NATURE OF MATHEMATICS, AND LEARNING AND TEACHING MATHEMATICS

Qiao-Ping Zhang* (1), Natthapoj Vincent Trakulphadetkrai (2)
(1: The Chinese University of Hong Kong; 2: University of Reading)
HONG KONG PRIMARY MATHEMATICS TEACHERS’ BELIEFS ABOUT THE INTEGRATION OF CHILDREN’S LITERATURE IN MATHEMATICS TEACHING

Ping Yu*, Haiyue Jin
(Nanjing Normal University)
A CORRELATION STUDY ON EPISTEMOLOGICAL BELIEFS, THEORETICAL KNOWLEDGE AND TEACHING BEHAVIOR OF MATHEMATICS TEACHERS

Location: B: dark-brown, East Wing Building, room 124

Group B – Session Chair: Markku S. Hannula
Presentations: Julie-Ann Edwards (1), Lotta Viika* (2)
(1: University of Southampton; 2: Aldworth School)
MATHEMATICS ANXIETY IN SCHOOL: IMPLICATIONS OF GENDER DIFFERENCES
Antonio Lara-Barragán (1), Cristina Eccius-Wellmann (1), Stefan Freitag* (2), Bastian Martschink (2)
(1: Universidad Panamericana; 2: Hochschule Bonn-Rhein-Sieg)
EXPLAINING DIFFERENCES IN MATH-ANXIETY PROFILES BETWEEN GERMAN STUDENTS AND MEXICAN STUDENTS

Marilyn Curtain-Phillips*
(Fairfield County Schools)
HOW TO REDUCE MATHEMATICS ANXIETY IN THE CLASSROOM

**Location:** B: dark-brown, East Wing Building, room 108

**Group C** – Session Chair: Francesca Morselli
Presentations: Theresa Krassnigg*
(Alpen-Adria-University Klagenfurt)
PARENTS’ AND THEIR CHILDREN’S BELIEFS TOWARDS MATHEMATICS AND ITS TEACHING

He Wei*, Jia Xujie, Zhao Jie
(Minzu University of China)
INVESTIGATION AND ANALYSIS ABOUT STUDENT MATHEMATICS LEARNING ATTITUDE IN CHINESE RURAL AREAS

Fangchun Zhu*
(China)
STUDENTS’ CONFIDENCE IN LEARNING MATHEMATICS: A STUDY OF STUDENTS FROM SHANGHAI

**Second Session: Tuesday, 26 July 2016, 16.30 – 18.00**
**Location:** B: dark-brown, East Wing Building, room 222

**Group A** – Session Chair: Emine Erktin
Presentations: Marina De Simone*
(École normale supérieure de Lyon)
THE RÆMOTIONALITY OF A MATHEMATICS TEACHER EXPLAINING LINEAR EQUATIONS WITH GEOGEBRA

Shashidhar Belbase*
(Zayed University)
VISUALIZATION DEBUNKS MEANING AND POWER – A BELIEF

Sabine Stöcker-Segre* (1,2)
(1: Achva Academic College; 2: Davidson Institute of Science Education)
IDENTITY EMPOWERING MATH – EXPERIENCES WITH A JEWISH-ARABIC MATH SEMINAR

Hyun Jung Kang* (1), Paula Guerra Lombardi (2)
(1: University of Northern Colorado; 2: Kennesaw State University)
LISTENING FOR THE DIFFERENCE THROUGH TEACHER IDENTITY

Okan Arslan*, Çigdem Haser
(Middle East Technical University)
HOW DID I BECOME SUCH A MATHEMATICS TEACHER?
Location: B: dark-brown, East Wing Building, room 124

Group B – Session Chair: Francesca Morselli
Presentations: Bumi Kim*
(Wonkwang University)
RELATIONSHIPS AMONG STUDENTS’ ACADEMIC STRESS AND MATHEMATICS LEARNING MOTIVATION

Xiaoqing Li*
(Shenzhen University)
A STUDY OF ACHIEVEMENT EMOTIONS IN MATHEMATICS IN THE CHINESE PRIMARY STUDENTS

Cao Chunyan*
(Northwest Normal University)
THE SURVEY AND ANALYSIS OF JUNIOR SCHOOL STUDENTS’ MATHEMATICS ADVERSITY QUOTIENT

Hongbiao Yin (1), Wei Lin* (2)
(1: The Chinese University of Hong Kong; 2: The Chinese University of Hong Kong)
EFFECTS OF EMOTIONAL SCAFFOLDS ASSISTED COGNITIVE ADVANCE ORGANIZERS ON ELEMENTARY STUDENTS’ MATHEMATICS LEARNING

Amanda Marina Andrade Medeiros*
(Universidade de Brasilia)
MATHEMATICS LEARNING DIFFICULTY AND AFFECTIVITY: AN INVESTIGATION IN THE POSTGRADUATE WORKS IN BRAZIL

Location: B: dark-brown, East Wing Building, room 108

Group C – Session Chair: Francesca Morselli
Presentations: Anne Margaret Cawley*, Max Altman
(University of Michigan)
“WHY AM I HERE?”: CHANGES IN STUDENTS’ SELF-ASSESSMENT AND MATHEMATICAL BELIEFS DURING A DEVELOPMENTAL MATHEMATICS COURS

Forster D. Ntow* (01), Lesa M. Covington Clarkson (02)
(1: University of Cape Coast; 2: University of Minnesota)
WHAT DOES IT MEAN TO BELONG? HIGH SCHOOL STUDENTS’ SENSE OF BELONGING IN MATHEMATICS CLASSROOMS

Boris Girnat*
(University of Applied Sciences and Arts Northwestern Switzerland School of Teacher Education)
MEASURING STUDENTS’ BELIEFS ON TEACHING METHODS AND MATHEMATICAL WORLDVIEWS FOR A LARGE SCALE ASSESSMENT

Maria Reyna Cruz*, Maria D. Cruz Quiñones, Maria Del Rosario Cruz Quiñones
(Universidad Autónoma de cd. Juárez)
STUDENTS’ DISPOSITION TOWARDS MATHEMATICS AT THE HIGH SCHOOL LEVEL

Ralf Erens*
(University of Education Freiburg)
BELIEF CHANGES: THE MATHEMATICAL SOCIALISATION OF CALCULUS TEACHERS
Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: B: dark-brown, East Wing Building, room 222

Group A – Session Chair: Qiao-Ping Zhang
Presentations: Patrick Barmby* (University of the Witwatersrand)
PRE-SERVICE PRIMARY TEACHERS’ ATTITUDES TOWARDS MATHEMATICS: AN EMPIRICAL STUDY GROUNDED IN THE SOUTH AFRICAN CONTEXT

Esther M. H. Billings*, Lisa Kasmer (Grand Valley State University)
FOSTERING A MUTUALLY BENEFICIAL RELATIONSHIP BETWEEN FACULTY AND STUDENTS TO PROMOTE A POSITIVE LEARNING ENVIRONMENT

Mark Arvidson*, Elizabeth Rivas (Azusa Pacific University)
EXAMINING THE ATTITUDES OF PRE-SERVICE ELEMENTARY SCHOOL TEACHERS TOWARD MATHEMATICS

Tiziana Pacelli* (1), Cristina Coppola (1), Benedetto Di Paola (2), Pietro Di Martino (3), Cristina Sabena (4)
MATHEMATICS FUTURE PRIMARY TEACHERS’ AFFECT: BACK TO THE FUTURE

Location: B: dark-brown, East Wing Building, room 124

Group B – Session Chair: Francesca Morselli
Presentations: Valorie Lynn Zonnefeld* (Dordt College)
IMPLICATIONS OF GROWTH MINDSET TRAINING ON UNDERGRADUATE STATISTICS STUDENTS BY GENDER

Ana Belén Montoro Medina* (1), Francisco Gil Cuadra (2), José Antonio Fernández Bravo (1), Juan Jesús Barbarán Sánchez (3)
(1: Camilo José Cela University; 2: University of Almería; 3: University of Granada)
PROBLEM SOLVING: MAIN “FLOW” ACTIVITY IN MATHEMATICS TO UNIVERSITY STUDENTS

Paul Hernandez-Martinez*, Helen Harth (Loughborough University)
EMOTIONS IN UNDERGRADUATE MATHEMATICAL MODELLING GROUP WORK

Josefa Perdomo Diaz* (1,2), Patricio Felmer (1,2), Valentina Giaconi (1,2)
(1: Centro de Modelamiento Matemático; 2: Centro de Investigación Avanzada en Educación)
PRIMARY AND SECONDARY STUDENTS’ VIEWS OF THEMSELVES IN RELATION WITH MATHEMATICS AND DIFFERENCES BETWEEN GRADES
**Location: B: dark-brown, East Wing Building, room 108**

**Group C** – Session Chair: Markku S. Hannula  
Presentations: Tracy Elyse Dobie*  
(Northwestern University)  
INTERDEPENDENCE IN MIDDLE SCHOOL STUDENTS’ CONCEPTIONS OF USEFULNESS IN MATHEMATICS  
Chunlian Jiang* (1), Wee Tiong Seah (2), Tasos Barkatsas (3), Io Keong Cheong (1)  
(1: University of Macau; 2: University of Melbourne; 3: RMIT University)  
WHAT MACAO STUDENTS VALUE IN MATHEMATICS LEARNING  
Hengjun Tang* (1), Wee Tiong Seah (2), Weizhong Zhang (1)  
(1: College of Teacher Education; 2: Melbourne Graduate School of Education)  
WHAT GET VALUED SIMILARLY AND DIFFERENTLY IN THE AUSTRALIAN AND CHINESE MATHEMATICS CURRICULA: A COMPARATIVE STUDY  
Maike Vollstedt*, Christoph Duchhardt  
(University of Bremen)  
CAN THE STUDENTS’ PERSONAL MEANING OF LEARNING MATHEMATICS BE ASSESSED WITH A PAPER AND PENCIL QUESTIONNAIRE?

**Fourth Session: Friday, 29 July 2016, 16.30–18.00**  
**Location: B: dark-brown, East Wing Building, room 222**

**Group A** – Session Chair: Qiao-Ping Zhang  
Presentations: Yung-Chi Lin* (1), Siew Yin Ho (2)  
(1: National Changhua University of Education; 2: Nanyang Technological University)  
WHAT STUDENTS THINK ABOUT MATHEMATICS TEACHERS’ DRAWINGS OF A CLASSROOM TEACHING  
Xiaoli Lu*, Frederick K. S. Leung  
(The University of Hong Kong)  
INVESTIGATING SHANGHAI BEGINNING MATHEMATICS TEACHERS’ BELIEFS IN THEIR FIRST TWO TEACHING YEARS  
Qian Chen* (1), Frederick Koon Shing Leung (2)  
(1: Sichuan Normal University; 2: The University of Hong Kong)  
FACTORS INFLUENCING TEACHERS’ BELIEF CHANGE IN THE CONTEXT OF CHINA’S RECENT MATHEMATICS CURRICULUM REFORM  
Figen Uysal* (1), Yüksel Dede (2)  
(1: Bilecik eyh Edebali University; 2: Gazi University)  
THE EFFECT OF TEACHING EXPERIENCE ON TURKISH MATHEMATICS TEACHERS’ MATHEMATICAL BELIEFS

**Location: B: dark-brown, East Wing Building, room 124**

**Group B** – Session Chair: Markku S. Hannula  
Presentations: João Luiz Muzinatti*  
(UNESP Rio Claro)  
THE “LAST MAN” AND MATHEMATIC EDUCATION
Graham Rankin*  
(Kwantlen Polytechnic University)

A MOTIVATIONAL THEORY FOR HOMEWORK

Giang-Nguyen Thi Nguyen* (1), Barbara Otto (2), Byron Havard (1), Carla Thompson (1)  
(1: University of West Florida; 2: Goethe University of Frankfurt)

IMPACT OF TIME SPENT ON HOMEWORK, MOTIVATION, AND PARENTAL INVOLVEMENT ON LOW-ACHIEVING STUDENTS' SUCCESS

Sarah Beumann*  
(Ruhr-Universität Bochum)

MATHEMATICAL EXPERIMENTS AND THEIR IMPACT ON STUDENTS BASIC NEEDS

TSG 29 – Mathematics and creativity

Co-chairs: Dace Kuma (Latvia), Demetra Pitta-Pantazi (Cyprus)  
Team members: Alex Friedlander (Israel), Thorsten Fritzlar (Germany), Emiliya Velikova (Bulgaria)

First Session: Tuesday, 26 July 2016, 15.00–16.00  
Location: B: dark-brown, East Wing Building, room 232

Session Chairs: Emiliya Velikova, Dace Kuma  
Presentations: Hamlet S. Mikaelian*  
(Kh. Abovyan Armenian State Pedagogical University)

BEAUTY AND THE EDUCATIONAL POTENTIAL OF MATHEMATICS

Noriko Tanaka*  
(Toyota-nishi High School)

MAKING PROBLEM-ASKING THE STUDENTS TO MAKE UP PROBLEM

Dündar Sefa (1), Mehmet Bulut* (2)  
(1: Abant Izzet Baysal University; 2: Gazi University)

INVESTIGATION OF PRESERVICE TEACHERS’ BRAIN WAVES DURING SOLUTION PROCESS OF CREATIVE SPATIAL PROBLEMS

Young-Han Choe*  
(Korean Society of Mathematical Education)

SOUTH KOREA’S EDUCATION SYSTEM DESTROYS STUDENTS’ MATHEMATICAL CREATIVITY

Second Session: Tuesday, 26 July 2016, 16.30–18.00  
Location: B: dark-brown, East Wing Building, room 232

Session Chairs: Alex Friedlander, Torsten Fritzlar  
Presentations: Bruce Stuart Ferrington*  
(Radford College)

IF WE’VE ALL GOT THE SAME ANSWER, WE MUST BE ASKING THE WRONG QUESTION

Daud Mamiy*, Saida Mamiy  
(Adyghe State University)

MATHEMATICAL CIRCLE AS START-UP IN MATHEMATICS
Tereza Bártlová*
(Charles University in Prague)
LEARNING MATHEMATICS IN AN AMUSING WAY

Oscar João Abdounur*
(University of Sao Paulo)
RATIOS AND MUSIC STRUCTURAL PROBLEMS IN HISTORY:
A HEURISTIC / ANALOGIC / EDUCATIONAL APPROACH

Santi Vilches*, Maite Gorriz
(IINS Arquitecte Manuel Raspall)
LEARNING USING YOUR OWN CREATIVE PROCESS

TSG 31 – Language and communication in mathematics education

Co-chairs: Judit Moschkovich (USA), David Wagner (Canada)
Team members: Arindam Bose (South Africa), Jackeline Rodrigues Mendes (Brazil),
Marcus Schütte (Germany)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: H: orange, Educational Building, room 08

Session Chair: Arindam Bose
Presentations: Ana Carolina Faustino*
(State University of São Paulo – Unesp – Rio Claro)
SWEIV DLROW : DIALOGUE AS METTING OF DIFFERENT WORLD VIEWS

Marei Fetzer (1), Kerstin Tiedemann* (2)
(1: Goethe-University of Frankfurt; 2: University of Cologne)
THE INTERPLAY OF LANGUAGE AND OBJECTS IN THE PROCESS OF ABSTRACTING

Ruilin Wang (1), Jingbin Zhang* (1), YiQiao Zhang (2)
(1: Capital Normal University; 2: Beijing No. 55 Middle School)
ON OPERATION AND FUNCTION OF MATHEMATICS JOURNAL IN JUNIOR HIGH SCHOOL

Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: H: orange, Educational Building, room 08

Group A – Session Chair: Marcus Schütte
Presentations: Rachael Kenney*, Jennifer Richardson
(Purdue University)
HELPING TEACHERS UNPACK THE ACADEMIC LANGUAGE OF MATHEMATICS

Sedef Celik*
(Artvin Çoruh University)
HOW PROSPECTIVE MATHEMATICS TEACHERS ARE USING MATHEMATICAL
LANGUAGE IN THE CLASSROOM?

Da Liu*
(Teaching Research Section of Shanghai Municipal Education Commission)
SOME SUGGESTIONS FOR CULTIVATING STUDENTS’ MATHEMATICAL
LANGUAGE COMMUNICATION AND EXPRESSION ABILITY
Annika Meike Wille*
(Alpen-Adria-Universität Klagenfurt)
DEVELOPING MATHEMATICAL LANGUAGE PROFICIENCY IN PRESERVICE TEACHER EDUCATION: A CASE STUDY

Rune Herheim*, Toril Eskeland Rangnes
(Bergen University College)
STUDENTS’ ARGUMENTATION FOR WORKING WITH A RISK ISSUE IN MATHEMATICS

Location: H: orange, Educational Building, room 404

Group B – Session Chair: Jackeline Rodrigues Mendes
Presentations: Lorena Trejo*, Marta Valdemoros
(Center of Research and Advanced Studies of the Institute Polytechnics Institute National)
THE DIVISION IN ELEMENTARY SCHOOL: THE CASE OF TEACHER KARINA

David Allen Thomas (1), Gerrit Hendrikus Stols* (2)
(1: University of Great Falls; 2: University of Pretoria)
MATH TALK: ANALYZING THE TIMSS VIDEO TRANSCRIPTS

Máire Ní Riordáin*, Aisling McCluskey
(NUI Galway)
A COMPARISON OF IRISH AND ENGLISH LANGUAGE LEARNING DISCOURSES IN MATHEMATICS

Zhou Chang jun*
(Dehong teachers’ college)
CASE STUDY ON MATHEMATICAL COMMUNICATION FOR ETHNIC MINORITY STUDENT IN GRADE 8 DEHONG PREFECTURE SOUTH-WEST CHINA

Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: I: blue, Philosophical Tower, lecture hall C

Group A – Session Chair: Richard Barwell, Anjum Halai (Joint Session with TSG 32)
Panel discussion: Intersections and differences in work on language in monolingual and multilingual/multicultural classrooms and settings
Panelists: Richard Barwell, Anjum Halai, Arindam Bose, Jacqueline Rodrigues, Marcus Schütte

Location: I: blue, Philosophical Tower, lecture hall G

Group B – Session Chair: Judit Moschkovich, David Wagner (Joint Session with TSG 32)
Panel discussion: Intersections and differences in work on language in monolingual and multilingual/multicultural classrooms and settings
Panelists: Judit Moschkovich, David Wagner, Aldo Parra, Lena Wessel

Fourth Session: Friday, 29 July 2016, 16.30 – 18.00
Location: H: orange, Educational Building, room 08

Session Chair: Judit Moschkovich
Presentations: Christine Bescherer, Pelagia Papadopoulou*
(University of Education)
PODCASTS IN SECOND LANGUAGE MATH TEACHING AS AN INSTRUMENT FOR MEASURING TEACHERS’ LANGUAGE AWARENESS
M. Alejandra Sorto* (1), Aaron T. Wilson (2), Alexander White (1)
(1: Texas State University; 2: The University of Texas Rio Grande Valley)
TEACHER KNOWLEDGE AND TEACHING PRACTICES IN LINGUISTICALLY DIVERSE CLASSROOMS

Carina Zindel*
(TU Dortmund)
LANGUAGE LEARNERS DEALING WITH FUNCTION WORD PROBLEMS:
RELATING LINGUISTIC MEANS AND THE SYMBOLIC SIGN SYSTEM

Faith Lindiwe Tshabalala*
(Gauteng Department of Education)
EXPLORING HOW A GRADE 7 TEACHER PROMOTES MATHEMATICAL REASONING IN MULTILINGUAL MATHEMATICS CLASS

Sasha Wang*
(Boise State University)
A DISCOURSE APPROACH TO GEOMETRIC THINKING

TSG 32 – Mathematics education in a multilingual and multicultural environment

Co-chairs: Richard Barwell (Canada), Anjum Halai (Pakistan)
Team members: Guida de Abreu (UK), Aldo Parra (Colombia), Lena Wessel (Germany)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: I: blue, Philosophical Tower, room 263

Session Chair: Aldo Parra
Presentations: Rebecca Klose*
(Justus-Liebig-Universität Gießen)
COMMUNICATING MATHEMATICALLY IN BILINGUAL SETTINGS

Fatima Assaf*
(University of Ottawa)
“MATH IS ONLY IN ENGLISH, IT’S PROHIBITED IN ARABIC“:
HOW ENGLISH SHAPES THE MATHEMATICAL PRACTICES OF A CLASSROOM

Jose Martinez-Hinestroza*
(Michigan State University)
SUPPORTING BILINGUAL MATHEMATICAL DISCUSSIONS:
INSTRUCTIONAL STRATEGIES

Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: I: blue, Philosophical Tower, room 263

Session Chairs: Anjum Halai, Richard Barwell
Presentations: Anita Bright* (1), G. Sue Kasun (2)
(1: Portland State University; 2: Utah State University)
NEW WAYS OF KNOWING: BILINGUAL TEACHER CANDIDATES’ SHIFTING SENSE OF SELF IN MATHEMATICS
Sarah A. Roberts* (University of California Santa Barbara)
THE ROLE OF VIDEO IN MATHEMATICS PROFESSIONAL LEARNING FOR EXPLORING SUPPORTING MULTILINGUAL LEARNERS

Ryoon-Jin Song* (1), Mi-Kyung Ju (2)
(1: University of Wisconsin Madison; 2: Hanyang University)
AN ANALYSIS OF KOREAN MATHEMATICS TEACHERS’ BELIEFS IN MATHEMATICS AS A SCHOOL SUBJECT AND ITS TEACHING

Ji Yeong I.* (1), Zandra de Araujo (2)
(1: Iowa State University; 2: University of Missouri)
CONNECTING MATH AND CULTURE TO TEACH ELS

Benedetto Di Paola (1), Giovanni Giuseppe Nicosia* (2)
(1: Dipartimento di Matematica e Informatica; 2: I.S. Aldini Valeriani Sirani)
CULTURE AS RESOURCE OR OBSTACLE FOR TEACHER? THE CASE OF CHINESE STUDENTS IN ITALIAN CLASSROOM

Third Session: Friday, 29 July 2016, 15.00–16.00
Location: I: blue, Philosophical Tower, lecture hall C

Group A – Session Chairs: Richard Barwell, Anjum Halai (Joint Session with TSG 31)
Panel discussion: Intersections and differences in work on language in monolingual and multilingual/multicultural classrooms and settings
Panelists: Richard Barwell, Anjum Halai, Arindam Bose, Jacqueline Rodrigues, Marcus Schütte

Location: I: blue, Philosophical Tower, lecture hall G

Group B – Session Chairs: Judit Moschkovich, David Wagner (Joint Session with TSG 31)
Panel discussion: Intersections and differences in work on language in monolingual and multilingual/multicultural classrooms and settings
Panelists: Judit Moschkovich, David Wagner, Aldo Parra, Lena Wessel

Fourth Session: Friday, 29 July 2016, 16.30–18.00
Location: I: blue, Philosophical Tower, room 263

Session Chair: Lena Wessel
Presentations: Zhang Heping* (1), Song Naiqing (1), Zhang Nan (2)
(1: Southwest University; 2: Tianjin Normal University)
CULTURAL CONFLICT AND REGRESSION OF EDUCATION:
THOUGHTS ON THE MATHEMATICS EDUCATION FOR ETHNIC MINORITIES IN CHINA

Weizhong Zhang*, Qingkuo Sun
(Zhejiang Normal University)
A COMPARATIVE STUDY ON CHINA’S MATHEMATICS TEXTBOOKS FOR JUNIOR HIGH SCHOOL FROM A MULTICULTURAL PERSPECTIVE

Peter Aaron Mayengo Kajoro*
(The Aga Khan University)
LANGUAGE AND MATHEMATICS TEXTBOOKS IN TANZANIA’S MULTILINGUAL EDUCATIONAL CONTEXT
Jing Wang*, Aoxue Su, Wei He, Xujie Jia, Fang Liang
(Minzu University)
A SURVEY RESEARCH ON MATH ACHIEVEMENTS OF TIBET STUDENT IN THE FIFTH GRADE

Lindiwe Tshuma* (1,2)
(1: African Institute for Mathematical Sciences Schools Enrichment Centre; 2: Stellenbosch University)
RELATIONSHIP BETWEEN LANGUAGE COMPETENCY AND INTERMEDIATE PHASE MATHEMATICS INSTRUCTION: A CASE OF THE EASTERN CAPE

TSG 33 – Equity in mathematics education (including gender)

Co-chairs: Bill Atweh (Philippines), Joanne Rossi Becker (USA)
Team members: Barbro Grevholm (Norway), Gelsa Knijnik (Brazil), Laura Martignon (Germany), Jayasree Subramanian (India)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: K: purple, Law Building, room 11

Session Chair: Joanne Rossi Becker
Presentations: Sally-Ann Robertson*
(South African Numeracy Chair Project)
TEACHER’S QUESTIONING PRACTICES AND ISSUES OF LEARNER AGENCY IN MATHEMATICS CLASSROOMS

Guilherme Henrique Gomes da Silva* (1,2)
(1: Sao Paulo State University; 2: Federal University of Alfenas)
EQUITY IN THE HIGHER EDUCATION: THE ROLE OF MATHEMATICS EDUCATION FACED WITH AFFIRMATIVE ACTIONS

Chang-Hua Chen*, Chia-Hui Lin
(National Academy for Educational Research)
DEVELOPING DIFFERENTIATED INSTRUCTION TO CLOSE LEARNING ACHIEVEMENT GAP IN MATHEMATICS

Niamh O’Meara* (1), Mark Prendergast (2)
(1: EPI*STEM, University of Limerick; 2: Trinity College Dublin)
AN INVESTIGATION INTO THE INEQUITY SURROUNDING MATHEMATICS INSTRUCTION TIME

Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: K: purple, Law Building, room 11

Session Chair: Gelsa Knijnik
Presentations: Rosie Lopez Conde*
(Caraga State University-Butuan City)
PRE-SERVICE TEACHERS’ PRAXEOLOGY IN TEACHING MATHEMATICS FOR SOCIAL JUSTICE AND EQUITY
Lena Lindenskov (1), Steffen Overgaard (2), Pia Tonnesen* (2), Peter Weng (2)  
(1: Danish School of Education; 2: Metropolitan University College)  
RESEARCH ON EARLY INTERVENTION PROGRAMS IN DENMARK AS A MEANS TO EQUITY

Jennifer Marie Langer-Osuna*, Jennifer Munson  
(Stanford University)  
SUPPORTING ELEMENTARY TEACHERS’ CAPACITY TO FOSTER EQUITABLE AND PRODUCTIVE MATHEMATICS CLASSROOMS

Alice LaRue Joy Cook*  
(University of Maryland)  
IMPLEMENTATION OF SOCIAL JUSTICE MATHEMATICS: EXPERIENCES & PERCEPTIONS OF SECONDARY MATH TEACHERS

TSG 34 – Social and political dimensions of mathematics education

Co-chairs: Murad Jurdak (Lebanon), Renuka Vithal (South Africa)  
Team members: Peter Gates (UK), Elizabeth de Freitas (USA), David Kollosche (Germany)

First Session: Tuesday, 26 July 2016, 15.00–16.00  
Location: D: yellow, West Wing Building, room 121

Session Chair: Renuka Vithal  
Presentations: Suela Kacerja*  
(Bergen University College)  
(MORE) REASONS FOR TEACHING (CRITICAL) MATHEMATICS USED IN DIFFERENT REAL-LIFE SITUATIONS

Reinhard Hochmuth, Johanna Ruge*  
(Leibniz University Hannover)  
THE RECONSTRUCTION OF MATHEMATICAL PRACTICES IN SIGNAL THEORY: REMARKS CONCERNING LOGOS BLOCKS AND RECOGNITION RULES

Takashi Nakanishi*  
(Hiroshima University)  
REVISITING OF DEMOCRATIC COMPETENCE THROUGH MATHEMATICS EDUCATION: FOCUSING ON INTERNATIONAL TRENDS OF CRITICAL THINKING

Tania Andrade*, Pamela Montero  
(University Diego Portales)  
MATHEMATICS CURRICULUM DESIGN FROM THE PERSPECTIVE OF CITIZENSHIP: A CRITICAL DISCOURSE ANALYSIS
TSG 35 – Role of ethnomathematics in mathematics education

Co-chairs: Milton Rosa (Brazil), Lawrence Shirley (USA)
Team members: Willy V. Alangui (Philippines), Maria Elena Gavarrete (Costa Rica)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: H: orange, Educational Building, room 205

Group A – Session Chair: Milton Rosa
Presentations: Hongshick Jang*
(Songea Girls Secondary School)
LANGUAGE, ETHNOMATHEMATICS AND TECHNOLOGY IN MATHEMATICS EDUCATION CHALLENGES AND PITFALLS – THE CASE OF TANZANIA
Toyanath Sharma*
(Kathmandu University)
MEANINGFUL MATHEMATICS THROUGH CULTURAL ARTIFACTS
Alexandrina Monteiro*, Jackeline Rodrigues Mendes
(UNICAMP)
KNOWLEDGE MOBILIZATION IN CULTURAL PRACTICES: ETHNOMATHEMATICS AS A CONTEUR-CONDUCT MOVEMENT

Location: H: orange, Educational Building, room 206

Group B – Session Chair: Maria Elena Gavarrete
Presentations: Kay Owens*
(Charles Sturt University)
THE ROLE OF CULTURE AND ECOLOGY IN VISUOSPATIAL REASONING: THE POWER OF ETHNOMATHEMATICS
Franco Favilli* (1), Fiorenza Turiano (2)
(1: Universita’ di Pisa; 2: Liceo Arimondi)
ON WHICH FINGER WILL THE NUMBER FALL?

Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: H: orange, Educational Building, room 07

Session Chair: Wilfredo Alangui
Presentations: José Ricardo Mafra* (1), Maria Cecilia Fantinato (2)
(1: Universidade Federal do Oeste do Pará; 2: Universidade Federal Fluminense)
PERCEIVED TECHNIQUES AND PROCESSES OF CRAFTSWOMEN’S WORK IN SANTARÉM / PA
Maria del Carmen Bonilla*
(Apinema: Asociación Peruana de Investigación en Educación Matemática)
TOOLS OF HISTORY OF MATHEMATICS AND DYNAMIC GEOMETRY IN THE PRE-SERVICE TRAINING IN INTERCULTURAL BILINGUAL EDUCATION
Ramesh Neupane*
(Kathmandu University School of Education)

TEACHING AND LEARNING MATHEMATICS IN A CULTURAL CONTEXT:
PING AS A PROJECT

Third Session: Friday, 29 July 2016, 15.00–16.00
Location: H: orange, Educational Building, room 205

Session Chair: Daniel Clark Orey
Presentations: Sudhakar Agarkar*
(Vidya Prasarak Mandal)
UNDERSTANDING THE UNITS OF LENGTH MEASUREMENT USED BY TRIBAL PEOPLE IN INDIA

André Gerstberger*, Leda Maria Giongo
(Centro Universitário UNIVATES)
ETHNOMATHEMATICS LOOK AT MOBILE USAGE REGARDING TEACHING MATHEMATICS PROCESSES IN ELEMENTARY EDUCATION FINAL YEARS

TSG 36 – Task design, analysis and learning environments

Co-chairs: Jiansheng Bao (China), Jere Confrey (USA)
Team members: Jonei Barbosa (Brazil), Helmut Linneweber-Lammerskitten (Switzerland), Anne Watson (UK)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: E: mint, Economical Building, room 2175/2181

Session Chair: Ann Watson
Presentations: Teo Paoletti* (1), Kevin C. Moore (2), Irma E. Stevens (2)
(1: Montclair State University; 2: University of Georgia)
TASK-DESIGN PRINCIPLES FOR COVARIATIONAL REASONING

Alik Palatnik* (1,2)
(1: The Technion; 2: UC Berkeley)
TOWARDS A TYPOLOGY OF STUDENTS’ MATHEMATICAL RESEARCH PROJECTS

Ida Ah Chee Mok*
(The University of Hong Kong)
EXPERIENCING MEANINGFUL SCHOOL MATHEMATICS: RICH TASKS FOR INEQUALITY

Leslie Dietiker*, Aaron Brakoniecki, Elyssa R. Miller, Andrew S. Richman
(Boston University)
ENACTED TASK DESIGN: TASKS AS WRITTEN IN THE CLASSROOM
Second Session: Tuesday, 26 July 2016, 16.30–18.00  
Location: E: mint, Economical Building, room 2175/2181

Session Chair: Ann Watson  
Presentations: Xiang Gao*, Bo Zhang  
(Yangzhou University)  
A COMPARISON OF NOVICE AND EXPERIENCED TEACHERS’ DESIGN OF A QUESTION SEQUENCE

Marc Schäfer* (1), Helmut Linneweber-Lammerskitten (2)  
(1: Rhodes University; 2: University of Applied Sciences Northwest Switzerland)  
ENHANCING MATHEMATICAL CURIOSITY THROUGH VITALMATHS VIDEO CLIP TASKS

Arthur Man Sang Lee*  
(The University of Hong Kong)  
DEVELOPING COLLABORATIVE RICH TASKS WITH TEACHERS IN HONG KONG CLASSROOMS

Phei Ling Tan* (1), Liew Kee Kor (2), Prof. Dr. Chap Sam Lim (3)  
(1: Universiti Sains Malaysia; 2: Universiti Teknologi MARA Malaysia; 3: Universiti Sains Malaysia)  
APPLYING ATTRIBUTE HIERARCHY METHOD IN TASK DESIGN AND ITEM ANALYSIS FOR THE TOPIC “TIME” IN PRIMARY MATHEMATICS

Choosak Udinkaew*, Jensamut Saengpun  
(Chiang Mai University)  
DESIGNING MATHEMATICAL TASKS FOR DEVELOPING MATHEMATICAL THINKING IN CLASSROOM TAUGHT THROUGH OPEN APPROACH

Charles E. Wilkes II*  
(University of Michigan)  
SOPHISTICATED MATHEMATICS: WHAT DOES IT LOOK LIKE FOR FIFTH GRADERS

Third Session: Friday, 29 July 2016, 15.00–16.00  
Location: E: mint, Economical Building, room 2175/2181

Session Chair: Jere Confrey  
Presentations: Susan Kathleen Forsythe*  
(University of Leicester)  
ANALYSIS OF STUDENTS’ WORK WITH A DYNAMIC FIGURE THROUGH THE LENS OF DUVAL

Shai Olsher*, Beba Shternberg, Michal Yerushalmy  
(University of Haifa)  
GUESS WHO: ADDRESSING MEANINGFUL CHARACTERISTICS AS MEANS TO DISCOVER WHICH IS THE CHOSEN DYNAMIC FIGURE

Ilya Aleksandrovich Posov* (1,2), Dmitry Irikovich Mantserov (3)  
(1: Saint Petersburg State University; 2: Saint Petersburg State Electrotechnical University “LETI”; 3: Limited Liability Company “ProfIT”)  
USING FREE SOFTWARE TO IMPLEMENT VERIFICATION PROBLEMS WITH PARAMETERS
Fourth Session: Friday, 29 July 2016, 16.30–18.00
Location: E: mint, Economical Building, room 2175/2181

Session Chair: Helmut Linneweber-Lammerskitten
Presentations: Sepideh Noruzi* (1), Mahmoud Mehrmohammadi (2)
(1: Tarbiat Modares University; 2: Tarbiat Modares University)
TECHING MATHEMATICS THROUGH DIFFERENT GENRES OF STORIES

Heather Lynn Johnson*
(University of Colorado Denver)
DESIGNING TECHNOLOGY-RICH TASKS TO FOSTER SECONDARY STUDENTS’ COVARIATIONAL REASONING

Antti Rasila* (1), Christopher J. Sangwin (2)
(1: Aalto University; 2: The University of Edinburgh)
DEVELOPMENT OF STACK ASSESSMENTS TO UNDERPIN MASTERY LEARNING

Marie Joubert*, Ingrid Mostert
(African Institute of Mathematical Sciences)
USING ‘LEARNING EXPERIENCES’ IN SOUTH AFRICAN CLASSROOMS: IMPLICATIONS FOR A TEACHER TOOLKIT

Bibhya Sharma*, Bijeta Kumar, Akeshnil Bali
(University of the South Pacific)
ONLINE MATHEMATICS DIAGNOSTIC TEST AND REMEDIATION FOR NEW ENTRANTS IN HIGHER EDUCATION IN THE PACIFIC REGION

TSG 37 – Mathematics curriculum development

Co-chairs: Anita Rampal (India), Zalman Usiskin (USA)
Team members: Andreas Büchter (Germany), Iman Osta (Lebanon), Jeremy Hodgen (UK)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: K: purple, Law Building, room 14

Session Chair: Zalman Usiskin
Presentations: Kazuko Ito West* (1, 2)
(1: Institute of Teacher Education; 2: Keio Academy of New York)
JAPAN’S TEN YEAR EXPERIMENT: FROM 1998 THROUGH 2008

Shihu Lv, Chunyan Cao, Zhenying Wu*
(Northwest Normal University)
IMPLEMENTATION STATUS OF THE NEW MATHEMATICS CURRICULUM FOR SENIOR HIGH SCHOOL IN MAINLAND CHINA
Susan Hough*, Yvette Solomon, Paul Dickinson, Stephen Gough
(Manchester Metropolitan University)
COUNTERACTING FAILURE – USING A REALISTIC MATHEMATICS EDUCATION APPROACH WITH EXAMINATION RETAKE STUDENTS

Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: K: purple, Law Building, room 14
Session Chair: Andreas Büchter
Presentations: Jefferson Biajone* (1), Elisabeth Barolli (2)
(1: Itapetininga College of Technology; 2: State University of Campinas; 2: State University of Campinas)
THE DISCRETE MATHEMATICS CURRICULUM PRODUCTION TRAJECTORY IN A SYSTEM ANALYSIS AND DEVELOPMENT COURSE

Gina Patricia Paz Huamán*
(Sistema Nacional de Evaluación)
THE MAPS PROGRESS IN THE NEW MATH CURRICULUM PERU

Fourth Session: Friday, 29 July 2016, 16.30 – 18.00
Location: K: purple, Law Building, room 14
Session Chair: Anita Rampal
Presentations: Avital Elbaum-Cohen*
(Weizmann Institute of Science)
READING MATHEMATICAL TEXTS IN HIGH-SCHOOL – WORK IN PROGRESS

Evelyn Süss-Stepancik (1), Stefan Götz* (2)
(1: Pädagogische Hochschule für Niederösterreich; 2: Universität Wien)
SCHOOL MATHEMATICS AND MATHEMATICAL TRAINING: TWO HOTSPOTS IN THE CURRICULUM DEVELOPMENT FOR TEACHER EDUCATION

Elizabeth Kimber*, Anna Baker, Paul Brown, Julian Gilbey
(Faculty of Mathematics)
THE CAMBRIDGE MATHEMATICS EDUCATION PROJECT: CURRICULUM RESOURCES FOR POST-16 MATHEMATICS

TSG 38 – Research on resources (textbooks, learning materials etc.)
Co-chairs: Lianghuo Fan (UK), Luc Trouche (France)
Team members: Chunxia Qi (China), Sebastian Rezat (Germany), Jana Visnovska (Australia)

First Session: Tuesday, 26 July 2016, 15.00 – 16.00
Location: I: blue, Philosophical Tower, room 260
Group A – Session Chair: Chunxia Qi
Presentations: Mario Sánchez Aguilarr*, Apolo Castañeda
(National Polytechnic Institute)
AN ANALYSIS OF REPRESENTATIONS OF MATHEMATICIANS IN MEXICAN MATHEMATICS TEXTBOOKS
Soo-Yong Jeong* (1), Mi-Kyung Ju (1), Young Serk Park (2)
(1: Hanyang University; 2: Gyungin National University of Education)
AN ANALYSIS ON THE BRIDGEABILITY OF KOREAN MATHEMATICS TEXTBOOKS
FOCUSBING ON THE TASKS OF STATISTICS

Kukhwan Oh* (1), Jung Sook Park (2), Oh Nam Kwon (3)
(1: Graduate school of Seoul National University; 2: Yang Jae High School; 3: Seoul National University)
ANALYSIS ON RELATION AMONG DEFINITION OF IRRATIONAL NUMBERS,
REPRESENTATIONS AND EXAMPLES

Location: I: blue, Philosophical Tower, room 256/58

Group B – Session Chair: Luc Trouche
Presentations: Hans-Dieter Janetzko* (HTWG Konstanz)
CATO 2.0: A GENERAL MULTI-LINGUAL USER INTERFACE FOR CAS –
UNE INTERFACE UTILISATEUR MULTILINGUE

Anshan Pu*
(Yangzhou University)
COMPARISON ABOUT DIFFICULTY OF EXAMPLES OF PLANE VECTOR BETWEEN
THE PEP (A) VERSION AND THE IBDP VERSION

Angelina Matinde Bijura*
(Aga Khan University)
MOBILE MATHEMATICS LEARNING MATERIALS FOR SUB SAHARAN AFRICA

Location: I: blue, Philosophical Tower, lecture hall D

Group C – Session Chair: Jana Visnovska
Presentations: Franck Bellemain (1), Juliana Andrade Araripe (2),
Rosilângela Lucena Scanoni Couto* (3), Pedro Alessio Martins (4), Rogério Da Silva Ignácio (5)
(1: Federal University of Pernambuco; 2: Federal University of Pernambuco; 3: Federal University of Pernambuco; 4: Federal University of Pernambuco; 5: CAp-UPE and Universidade Anhanguera de São Paulo)
FROM TEXTBOOK TO LIVED RESOURCES: THE DIGITAL GUIDE OF THE
BRAZILIAN EVALUATION PROGRAM OF SCHOOL TEXTBOOK

Romina Ann Soon Yap*, Yew Hoong Leong
(National Institute of Education)
CONCRETISED MATHEMATICS TEACHING RESOURCES

Rosilângela Lucena* (1), Verônica Gitirana (2)
(1: Universidade Federal de Pernambuco-UFE; 2: Universidade Federal de Pernambuco-UFPE)
IN-SERVICE REFLEXIVE TEACHER TRAINNING: REQUERIMENTS FOR AN ENVIRONMENT
WITH PUBLISHING CHAINS

Roberto Mariano Araújo Filho* (1), Verônica Gitirana (1), Celso Gonçalves (2)
(1: Universidade Federal de Pernambuco – UFPE; 2: Centro Universitário do Triângulo – UNITRI)
COLLABORATION IN TEACHER INITIAL TRAINNING: ANALYSIS OF CONSTRAINTS
Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: I: blue, Philosophical Tower, room 260

**Group A** – Session Chair: Lianghuo Fan
Presentations: Erhan Bingolbali*, Ferhan Bingolbali, Ayse Elcin Summak
(Gaziantep University)
CURRICULUM, TEXTBOOK AND PROBLEM SOLVING

Elsa Pascual Santaolalla*, Belén M. Urosa Sanz
(Universidad Pontificia Comillas)
PROBLEM SOLVING IN PRIMARY EDUCATION MATHEMATICAL TEXTBOOKS IN SPAIN

Sebastian Walter*
(University of Augsburg)
MATH ADVENTURE – A PRAGMATIC APPROACH TO RESEARCH IN SUPPORT OF INCLUSION IN PRIMARY MATHEMATICAL EDUCATION

Carlos Alberto Fuentes*, Bidart Gastón, Cabral Gastón, Cafure Antonio
(Universidad Nacional de General Sarmiento)
RATIONALIZING DENOMINATORS AND THE NOTION OF CONJUGATE. THE ROLE OF TEXTBOOKS IN SPREADING WRONG MATHEMATICAL IDEAS

**Location: I: blue, Philosophical Tower, room 256/58**

**Group B** – Session Chair: Sebastian Rezat
Presentations: Xiaomei Liu* (1), Ruilin Wang (1), Huiying Zhang (2)
(1: Capital Normal University; 2: Shijiazhuang Education Institute)
A COMPARATIVE STUDY OF ILLUSTRATIONS IN THE OLD AND NEW MIDDLE SCHOOL MATH TEXTBOOKS

Peter Pausigere*
(South African Numeracy Chair)
EXPLORING THE TYPES OF IMAGES AND REPRESENTATIONS USED IN THE SOUTH AFRICAN GRADE 4 NUMERACY WORKBOOKS

Velayutham Sarveswary*, Lim Chap Sam
(University of Science Malaysia)
THE IDEATIONAL MEANING OF IMAGES ON WORKED EXAMPLES IN MALAYSIAN AND SINGAPOREAN MATHEMATICS TEXTBOOKS

Rute Elizabete Borba* (1), Juliana Azevedo (1), Marilena Bittar (2)
(1: Universidade Federal de Pernambuco; 2: Universidade Federal do Mato Grosso do Sul)
BRAZILIAN PRIMARY SCHOOL TEXTBOOKS: SYMBOLIC REPRESENTATIONS IN COMBINATORIAL SITUATIONS

Viviana Carolina Llanos*, Maria Rita Otero
(UNCPBA – CONICET)
THE MATHEMATICS TEXTBOOKS IN THE ARGENTINE SECONDARY SCHOOL: IMAGES AND ARGUING

Gracin Dubravka Glasnovic *
(Faculty of Teacher Education)
REPRESENTATION, COMPUTATION, INTERPRETATION, ARGUMENTATION: RESEARCH ON MATHEMATICAL ACTIVITIES IN MATHEMATICS TEXTBOOKS
Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: I: blue, Philosophical Tower, room 260

Group A – Session Chair: Sebastian Rezat
Presentations: Natividad Adamuz-Povedano*, Alexander Maz-Machado, Rafael Bracho-López
(University of Córdoba)
THEMATIC RESEARCH TRENDS IN MATHEMATICS EDUCATION PUBLISHED IN BOOKS FROM 1990 TO 2012

Xujie Jia*, Wei He, Xiaotian Sun, Shu Zhang
(Minzu University of China)
PROBLEMS AND SUGGESTIONS IN DEVELOPING BILINGUAL TEXTBOOKS OF SCIENCES IN ETHNIC REGIONS OF CHINA

Xiaoli Yang*
(Beijing Institute of Education)
ON HOW TO HELP STUDENTS BETTER UNDERSTAND FUNCTION CONCEPT THROUGH COMPARISON OF DIFFERENT MATH TEXTBOOKS

Lingyun Zhao*, Zhihui Chen
(East China Normal University)
A COMPARATIVE STUDY OF JUNIOR MIDDLE SCHOOL MATHEMATICAL EXERCISES’ COGNITIVE DIFFICULTY BETWEEN SHANGHAI AND TAIWAN

Location: I: blue, Philosophical Tower, room 256/58

Group B – Session Chair: Luc Trouche
Presentations: Marilena Bittar (1), Veronica Gitirana* (2)
(1: Universidade Federal de Mato Grosso do Sul; 2: Universidade Federal de Pernambuco)
MATHEMATICS LITERACY BRAZILIAN TEXTBOOKS (PNLD): A STUDY OF DISTRIBUTION OF SCHOOL MATHEMATIC CONTENT FIELDS

Sofia Hatziminadakis, Irem Ercan*
(University of South Florida)
ANALYSIS OF THE LEVELS OF MATHEMATICAL COMPLEXITY OF GEOMETRICAL TASKS IN 8TH GRADE AMERICAN, TURKISH AND GREEK TEXTBOOKS

Eloisa Benitez*, J. Rigoberto Gabriel
(Universidad Veracruzana)
SOME TEXTS’ ANALYSIS TO FIND CHARACTERISTICS OF REAL NUMBERS

Xiayan Shao*, Bao Jiansheng
(East China Normal University)
COMPARISON OF THE CONCEPT OF PROBABILITY IN HIGH SCHOOL TEXTBOOKS AMONG CHINA, AMERICA AND SINGAPORE

Location: I: blue, Philosophical Tower, lecture hall D

Group C – Session Chair: Lianghuo Fan
Presentations: Zhe Zhu*, Wei-zhong Zhang
(Zhejiang Normal University)
COMPARISON ON PYTHAGORAS THEOREM IN MATHEMATICS TEXTBOOKS OF THREE COUNTRIES
Cibelle Castro Assis* (1), Rosilângela Lucena (2)
(1: UFPB; 2: UFPE)
A MATH TEACHER’S RESOURCES IN THE COLLECTIVE PERSPECTIVE OF
THE DOCUMENTAL WORK

Miguel Ribeiro* (2), Rúbia Amaral (1), Juliana Godoy (1)
(1: UNESP – São Paulo State University; 2: University of Algarve)
THE ANGLE SYMBOLS IN SOME TEXTBOOKS OF MATHEMATICS

Mary Ann Huntley* (1), Maria Shea Terrell (1), Nicole Fonger (2)
(1: Cornell University; 2: University of Wisconsin-Madison)
THE ALGEBRA CONTENT OF HIGH-SCHOOL TEXTBOOKS IN THE US

Fourth Session: Friday, 29 July 2016, 16.30 – 18.00
Location: I: blue, Philosophical Tower, room 260

Group A – Session Chair: Chunxia Qi
Presentations: Qi Chunxia* (1), Wang Ruilin (2), Lin Mengwei (1), Jing Chen (3)
(1: Beijing Normal University; 2: Capital Normal University; 3: Beijing No. 101 Middle School)
DOES A PROJECT-BASED LEARNING MATERIAL IMPROVE STUDENTS’ UNDERSTANDING OF RATIONAL NUMBER? A CASE STUDY

Arati Sudhir Bapat* (1), Shikha Takker (2)
(1: Tata Institute of Social Science; 2: Homi Bhabha Centre for Science Education)
ENABLING TEACHERS FOR EFFECTIVE TEACHING-LEARNING IN THE CONSTRUCTIVIST CURRICULUM FRAMEWORK

Burcu Nur Bastürk Sahin*, Menekse Seden Tapan Broutin
(Uludag University)
ANALYSIS OF PRIMARY MATHEMATICS TEACHERS’ LESSON DOCUMENT PREPARATION PROCESSES

Josip Slisko*, Lidia Aurora Hernández Rebollar, José Antonio Juárez López
(Facultad de Ciencias Físico Matemáticas)
DETECTING ERROR IN A MATHEMATICS TEXTBOOK’S DRAWING: ARE REALLY HELPFUL RELATED PROFESSIONAL EXPERIENCE AND KNOWLEDGE?

Dyana Wijayanti* (1), Yoppy Wahyu Purnomo (2)
(1: University of Copenhagen; 2: University of Muhammadiyah)
A HISTORICAL STUDY OF HOW PROPORTION IN ARITHMETIC APPEARS IN INDONESIAN LOWER SECONDARY SCHOOL TEXTBOOKS

Location: I: blue, Philosophical Tower, room 256/58

Group B – Session Chair: Jana Visnovska
Presentations: Helen L. Siedel*, Andreas J. Stylianides
(University of Cambridge)
TEACHERS’ SELECTION OF RESOURCES IN AN ERA OF PLENTY

Fernando Jorge Bifano*
(Universidad Nacional Arturo Jauretche)
“LOGBOOKS”: A DOCUMENTATIONAL RESOURCE RELEVANT FOR STUDYING TEACHERS PROFESSIONAL DEVELOPMENT?
Oral Communications

TSG 39 – Large scale assessment and testing in mathematics education

Co-chairs: Rae Young Kim (Korea), Christine Suurtamm (Canada)
Team members: Edward Silver (USA), Stefan Ufer (Germany), Pauline Vos (Norway)

First Session: Tuesday, 26 July 2016, 15.00 – 16.00
Location: I: blue, Philosophical Tower, room 708

Session Chair: Edward Silver
Presentations: Brikena Djepaxhija*, Pauline Vos, Anne Berit Fuglestad
(University of Agder)
THE PISA SCORING GUIDELINES AND THEIR PRESCRIPTIONS FOR INTERPRETING A PROBLEM SITUATION

Raymond Brian Philpot*
(ACER)
DEVELOPING LARGE SCALE ASSESSMENTS: THEORY AND PRACTICE

Hiroko Kanoh*
(Yamagata University)
RELATIONSHIP BETWEEN USE OF ICT AND MATHEMATICS ACHIEVEMENT BASED ON PISA2012

Second Session: Tuesday, 26 July 2016, 16.30 – 18.00
Location: I: blue, Philosophical Tower, room 708

Session Chair: Pauline Vos
Presentations: Yongxiao Bai* (1), Danting Huang (2), Di Zhang (3)
(1: Beijing Institute of Education; 2: Beijing No.8 High School; 3: Faculty of Education)
STUDY ON STUDENTS’ GEOMETRIC INTUITION AND ITS ASSESSMENT IN GRADE 8
Oral Communications

Cigdem Alagoz*, Celil Ekici
(University of the Virgin Islands)
EVIDENCE BASED PLACEMENT INTO DEVELOPMENTAL MATH SEQUENCE AND
A MODEL FOR INDIVIDUALIZED LEARNING PROGRESSION

Sarah Bansilal*
(UKZN)
THE GRADE 9 NATIONAL ASSESSMENTS IN SOUTH AFRICA: A RASCH ANALYSIS

Páraic Thomas Treacy*
(University of Derby)
INCENTIVISING HIGHER LEVEL MATHEMATICS STUDY AT UPPER SECONDARY LEVEL:
THE CASE OF BONUS POINTS IN IRELAND.

Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: I: blue, Philosophical Tower, room 708

Session Chair: Stefan Ufer
Presentations: Jana T. Beitlich, Matthias C. Lehner*, Anselm R. Strohmaier, Kristina M. Reiss
(Technische Universität München)
THE RELATION OF EYE MOVEMENTS ON MATHEMATICAL TASKS AND TASK DIFFICULTY

Zhihui Chen*, Qiongqiong Liu, Lingyun Zhao, Sisi Song, Yinghui Li
(East China Normal University)
A COMPARISON STUDY ON PROBLEM SITUATIONS AND CHARACTERISTICS IN
MATHEMATICS ACADEMIC PROFICIENCY TESTS

Radoslav Dimitric*
(CUNY)
NATURAL TAXONOMY FOR BASIC MATHEMATICAL ABILITY

TSG 40 – Classroom assessment for mathematics learning

Co-chairs: Karin Brodie (South Africa), Denisse Thompson (USA)
Team members: Leonora Diaz Moreno (Chile), Natalie Sayac (France), Stanislaw Schukajlow (Germany)

First Session: Tuesday, 26 July 2016, 15.00 – 16.00
Location: G: green, Social Science Building, room A316

Session Chairs: Karin Brodie, Natalie Sayac
Presentations: Megan Burton* (1), Edward Silver (2), Valerie Mills (3), Wanda Audricht (4),
Marilyn Struchens (1)
(1: Auburn University; 2: University of Michigan; 3: Oakland School District;
4: Independent Consultant)
CONNECTING FORMATIVE ASSESSMENT TO CURRENT EDUCATIONAL
INSTRUCTIONAL STRATEGIES

Gladys Celis Nivera*
(Philippine Normal University)
DEVELOPING AN ANALYTIC RUBRIC TO ASSESS THE PRODUCTS AND
PROCESSES OF MATHEMATICAL INVESTIGATIONS
Second Session: Tuesday, 26 July 2016, 16.30–18.00  
Location: G: green, Social Science Building, room A316

Session Chairs: Karin Brodie, Leonora Diaz Moreno
Presentations: David Wright*, Jill Clark, Lucy Tiplady  
(Newcastle University)
DESIGNING FOR FORMATIVE ASSESSMENT

Annalisa Cusi* (1), Francesca Morselli (2), Cristina Sabena (1)  
(1: University of Torino; 2: University of Genova)
THE USE OF DIGITAL TECHNOLOGIES TO ENHANCE FORMATIVE ASSESSMENT PROCESSES

Gailt Nagari Haddif*, Michal Yerushalmi  
(University of Haifa)
CONSTRUCTION E-TASKS: DESIGN CONSIDERATIONS

Third Session: Friday, 29 July 2016, 15.00–16.00  
Location: G: green, Social Science Building, room A316

Session Chairs: Denisse Thompson, Stanislaw Schukajlow
Presentations: Julia Pilet (1), Julie Horoks* (2)  
(1: LDAR – UPEC; 2: LDAR – UPEC)
FORMATIVE ASSESSMENT IN TEACHER’S PRACTICE

Philip Sirinides*, Abigail Gray, Caroline Ebby  
(University of Pennsylvania)
INSTRUCTIONAL DECISION MAKING ROOTED IN A LEARNING TRAJECTORY ORIENTATION

Marty Tippens*  
(Woodbury University)
FORMATIVE ASSESSMENT IN THE MATHEMATICS CLASSROOM THROUGH THE SCAN AND POST TECHNIQUE

Fourth Session: Friday, 29 July 2016, 16.30–18.00  
Location: G: green, Social Science Building, room A316

Session Chairs: Denisse Thompson, Leonora Diaz Moreno
Presentations: Revathy Parameswaran*, S. U. Gopalakrishnan  
(PS Senior Secondary School)
FORMATIVE ASSESSMENTS IN CLASSROOMS IN THE INDIAN CONTEXT

Melise Camargo*, Kenneth Ruthven  
(University of Cambridge)
KNOWLEDGE OF FORMATIVE ASSESSMENT: A STUDY WITH MATHEMATICS TEACHERS IN THE FEDERAL DISTRICT OF BRAZIL
Melissa Valeska Andrade-Molina* (1), Leonora Diaz Moreno (2)
(1: Aalborg University; 2: Universidad de Valparaíso)
THE SPACE OF SCHOOL: GEOMETRY ASSESSMENT TOWARD A TRAINED EYE

TSG 41 – Uses of technology in primary mathematics education (up to age 10)
Co-chairs: Sophie Soury-Lavergne (France), Colleen Vale (Australia)
Team members: Francesca Ferrara (Italy), Krongthong Khairiree (Thailand), Silke Ladel (Germany)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: C: turquoise, Main Building, room 125

Session Chair: Sophie Soury-Lavergne
Presentations: Stephen Isaac Tucker* (1), Patricia S. Moyer-Packenham (2)
(1: Virginia Commonwealth University; 2: Utah State University)
THE MODIFICATION OF ATTRIBUTES, AFFORDANCES, ABILITIES, AND DISTANCE FOR LEARNING FRAMEWORK FOR USER-TOOL INTERACTIONS

Daniel Walter*
(TU Dortmund)
THE USAGE OF TABLET-APPLICATIONS BY STUDENTS WITH SPECIAL LEARNING NEEDS IN MATHEMATICS EDUCATION

Theodore Chao*, Stephen Lewis
(The Ohio State University)
DEVELOPING MOBILE/TABLET TECHNOLOGY FOR TEACHERS TO ORCHESTRATE MATHEMATICAL DISCUSSION

Third Session: Friday, 29 July 2016, 15.00–16.00
Location: C: turquoise, Main Building, room 125

Session Chair: Colleen Vale
Presentations: Andrew Philip Kwok*
(Diocesan Boys’ School Primary Division)
USING COMPUTER IN TEACHING MATHEMATICS AND ITS EFFECTS ON MOTIVATION AND LEARNING OUTCOMES OF PRIMARY STUDENTS

Christof Schreiber*, Rebecca Klose
(Justus Liebig Universität Gießen)
TALKING MATHEMATICS: PRIMAPODCAST

Francesca Ferrara*
(Università di Torino)
CHILDREN LEARNING NUMBERS WITH TOUCHCOUNTS
TSG 42 – Uses of technology in lower secondary mathematics education (age 10 to 14)

Co-chairs: Lynda Ball (Australia), Paul Drijvers (Netherlands)
Team members: Bärbel Barzel (Germany), Yiming Cao (China), Michela Maschietto (Italy)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: E: mint, Economical Building, room 0076b

Session Chair: Bärbel Barzel
Presentations: Ahlam Adnan Anabousy* (1, 2), Michal Tabach (1)
(1: Tel-Aviv university; 2: Alqasimi Academic College of Education)
USING GEOGEBRA TO ENHANCE STUDENTS’ INQUIRY ACTIVITY

Tobias Rolfes*, Jürgen Roth, Wolfgang Schnetz
(University of Koblenz-Landau)
EFFECTS OF DYNAMIC VISUALIZATIONS ON THE LEARNING OF MATHEMATICAL PHENOMENA

Carole Dording* (1), Romain Martin (1), Yves Kreis (1), Thibaud Latour (2)
(1: University of Luxembourg; 2: Luxembourg Institute of Science & Technology)
GEOGEBRATAO, VALIDATION OF AN ADAPTIVE LEARNING ENVIRONMENT OF DYNAMIC GEOMETRY.

Emine Aytekin*, Mine Isıksal-Bostan
(OĐTU)
MIDDLE SCHOOL STUDENTS’ ATTITUDES TOWARDS USE OF TECHNOLOGY IN MATHEMATICS LESSON AND GRADE LEVEL DIFFERENCES

Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: E: mint, Economical Building, room 0076b

Session Chair: Yiming Cao
Presentations: Umit Kul*
(Artvin Coruh University)
EFFECTS OF MATHEMATICAL SOFTWARE INTEGRATED PROFESSIONAL DEVELOPMENT COURSE ON PRIMARY MATHEMATICS TEACHERS

Fei Zhang* (1), Hong Yuan (2)
(1: Jiangsu Second Normal University; 2: Teaching Research Department of Pingshan)
RESEARCH ON PRACTICE OF MATHEMATICS MICRO CURRICULUM DESIGN IN JUNIOR HIGH SCHOOL

Zsolt Lavicza* (1), Markus Hohenwarter (1), Balazs Koren (2), Istvan Juhos (3)
(1: Johannes Kepler University; 2: Eotvos Lorand University; 3: University of Szeged)
DEVELOPING TEACHING RESOURCES AND A NEW TECHNOLOGY ENVIRONMENT TO ENHANCE MATHEMATICS EDUCATION IN HUNGARY

Steen Grode* (1,2)
(1: Metropolitan University College; 2: Roskilde University)
BUILT AROUND IT
**Third Session: Friday, 29 July 2016, 15.00 – 16.00**  
**Location: E: mint, Economical Building, room 0076b**

Session Chair: Paul Drijvers  
Presentations: Gulay Bozkurt*, Kenneth Ruthven  
(University of Cambridge)  
THE ACTIVITY STRUCTURE OF GEOGEBRA LESSONS

Edith Lindenbauer*  
(Pädagogische Hochschule Oberösterreich)  
THE USE OF DYNAMIC WORKSHEETS TO SUPPORT FUNCTIONAL THINKING IN LOWER SECONDARY SCHOOL

Lisa Göbel*  
(University of Duisburg-Essen)  
COMPARING DIFFERENT DYNAMIC VISUALIZATIONS TO INVESTIGATE THE ROLE OF PARAMETERS

Michela Maschietto*  
(University of Modena e Reggio Emilia)  
CLASSICAL AND DIGITAL TECHNOLOGIES FOR THE PYTHAGOREAN THEOREM

**Fourth Session: Friday, 29 July 2016, 16.30 – 18.00**  
**Location: E: mint, Economical Building, room 0076b**

Session Chair: Michela Maschietto  
Presentations: Yves Kreis* (1), Joseph Bertemes (2), Amina Kafai-Afif (2), Ben Haas (2)  
(1: University of Luxembourg; 2: SCRIPT – ADQS)  
THE PERSONALIZED AND MULTILINGUAL MATHEMATICAL LEARNING ENVIRONMENT MATHEMATIC

Barbara Kimeswenger*  
(Private Pädagogische Hochschule der Diözese Linz)  
ADDRESSING QUALITY ASPECTS OF DYNAMIC MATHEMATICS MATERIALS

Vincenzo Fragapane*  
(Pädagogische Hochschule Karlsruhe)  
APPLICATION SOFTWARE FOR MOBILE TECHNOLOGIES IN THE CONTEXT OF MATHEMATICS AND TEACHING
TSG 43 – Uses of technology in upper secondary mathematics education (age 14 to 19)

Co-chairs: Colette Laborde (France), Stephen Hegedus (USA)
Team members: Luis Moreno-Armella (Mexico), Hans-Stefan Siller (Germany), Michal Tabach (Israel)

First Session: Tuesday, 26 July 2016, 15.00 – 16.00
Location: E: mint, Economical Building, room 1083

Group A – Session Chair: Hans-Stefan Siller
Presentations: Cristina Eccius-Wellmann *, Rebeca Ascencio-González
(Universidad Panamericana)
A COMPUTER-AIDED ASSESSMENT FOR ALGEBRA STUDENTS

José Vicente Giliberti *
(Universidad Nacional de Salta)
GEOGEBRA INCIDENCE ANALYSIS IN THE ACADEMIC PERFORMANCE OF THE BEGINNER ENGINEERING STUDENTS

Francisco Ugarte, Mihály Martínez *, Cecilia Gaita
(Pontificia Universidad Católica del Perú)
A DIDACTICAL SITUATION FOR THE AREA BY BOUNDED APPROACH

Location: E: mint, Economical Building, room 2085

Group B – Session Chair: Michal Tabach
Presentations: Kun Xiang *, Lianghuo Fan
(University of Southampton)
CHINESE MATHEMATICS TEACHERS’ USE OF TECHNOLOGY IN THEIR INSTRUCTIONAL PRACTICE

Enver Tatar (1), Yılmaz Zengin * (2), Türkan Berrin Kagızmanlı (3)
(1: Atatürk University; 2: Dicle University; 3: Giresun University)
USING GEOGEBRA SOFTWARE IN THE LEARNING ENVIRONMENT IN THE LIGHT OF MATHEMATICS TEACHERS’ OPINIONS

Julia Ollesch *, Markus Vogel, Tobias Dörfler
(Pädagogische Hochschule Heidelberg)
THE DEVELOPMENT OF TEACHERS’ COMPETENCIES FOR MULTIMEDIA USE IN MATHEMATICS LESSONS

Helena Cristina Rocha *
(Faculdade de Ciências e Tecnologia)
TEACHERS’ USE OF THE DIFFERENT REPRESENTATIONS IN A CONTEXT OF TECHNOLOGY INTEGRATION
Second Session: Tuesday, 26 July 2016, 16.30–18.00  
Location: E: mint, Economical Building, room 1083

Group A – Session Chair: Stephen Hegedus  
Presentations: Satoru Sakanashi*  
(Tokyo Metropolitan Setagaya Municipal Fukasawa Junior High School)  
TEACHING MATERIALS ARE OBTAINED FROM EVERYDAY LIFE AND THE LESSON OF A PRIMARY FUNCTION IS CONSIDERED USING ICT

Priscilla Guez Rabelo Amaral* (1), Dirce Uesu Pesco (2), Humberto José Bortolossi (3)  
(1: Colégio Pedro II; 2: Universidade Federal Fluminense; 3: Universidade Federal Fluminense)  
EXPLORING GEOMETRY, ARITHMETIC AND ALGEBRA WITH TABLETS AND SMARTPHONES: TWO EXPERIENCES IN THE CONTEXT OF BASIC SCHOOL

Heinz Schumann*  
(University of Education Weingarten)  
AUTOMATED ALGEBRAIC CALCULATION OF INTERACTIVELY CONSTRUCTED GEOMETRIC FIGURES – A DIDACTIC ANALYSIS

Olga Fellus* (1), Yaniv Biton (2), Dafna Raviv (2)  
(1: University of Ottawa; 2: Centre for Educational Technology)  
MORE STUDENTS DO MORE ADVANCED MATH: MATHEMATIZING IN A VIRTUAL HIGH SCHOOL MATHEMATICS COURSE OFFERED TO STUDENTS WHO L

Location: E: mint, Economical Building, room 2085

Group B – Session Chair: Luis Moreno-Armella  
Presentations: Mohamed El-Sayed Ahmed El-Demerdash* (1),  
Pedro Lealdino Filho (2), Christian Mercat (2)  
(1: S2HEP; 2: S2HEP)  
KINESTHETIC PROMOTION OF FUNCTION GRAPH RECOGNITION AT UNIVERSITY LEVEL

Mduutshekelwa Ndlovu*  
(Stellenbosch University)  
AN INSTRUMENTAL GENESIS OF THE DERIVATIVE WITH SKETCHPAD DYNAMIC MATHEMATICS SOFTWARE

Veyssel Akçakın* (1,2), Gürcan Kaya (2), Mehmet Bulut (2)  
(1: Usak University; 2: Gazi University)  
NINTH GRADE STUDENTS’ VIEWS ABOUT GEOMETRIC FUNCTIONS APPROACH AND DYNAMIC MATHEMATICS SOFTWARE ON TEACHING FUNCTIONS

Hideyo Makishita*  
(Shibaura Institute of Technology)  
PROPOSAL OF FIGURE DRAWING USING CUI AND GUI – APPLICATION OF MATHEMATICS TO MATHEMATICS

Ruth Elizabeth Galindo Navarro* (1), Marcela Perlwitz (2), Claudio Fuentealba Acuña (3)  
(1: Universidad de Playa Ancha de Ciencias de la Educación; 2: Ivy Tech Community College. Lafayette; 3: Universidad de Santiago de Chile)  
APPROXIMATING POLYNOMIAL FUNCTION WITH TRIGONOMETRIC FUNCTION
Third Session: Friday, 29 July 2016, 15.00–16.00
Location: E: mint, Economical Building, room 2085

Session Chair: Jana Trgalova
Presentations: Ilyas Karadeniz* (1), Denisse R. Thompson (2)
(1: Loughborough University; 2: University of South Florida)
MATHEMATICS TEACHERS’ PURPOSES AND VIEWS OF USING GRAPHING CALCULATORS

Balazs Koren* (1), Theodosia Prodromou (2), Zsolt Lavicza (3)
(1: Eotvos Lorand University; 2: University of New England; 3: Cambridge University)
TEACHERS ROLE IN TECHNOLOGY-SUPPORTED MATHEMATICS LESSON SEQUENCES

Peter Esperanza* (1), Khristin Fabian (2)
(1: Barstow High School; 2: University of Dundee)
STUDENT PERCEPTIONS ON THE USE OF THE FLIPPED CLASSROOM MODEL FOR ADVANCED PLACEMENT MATHEMATICS

Fourth Session: Friday, 29 July 2016, 16.30–18.00
Location: E: mint, Economical Building, room 2085

Session Chair: Colette Laborde
Presentations: María Cristina Alancay Velázquez*
(Ministerio de Educación)
LAS TIC EN LAS AULAS DE TONONO

Inder Kumar Rana*
(Department of Mathematics)
ICT (I SEE IT) IN MATH EDUCATION – INDIAN PERSPECTIVE

Roghayeh Akhbari* (1), Hossein Nabati (2), Nastaran Akbari (3), Toktam Akbari Khalaj (4)
(1: Islamic Azad University of Mashhad Iran; 2: Mashhad University of Medical sciences; 3: Imam Reza International University; 4: Mashhad University of Medical sciences)
GENERAL VIEW OF COMPARISON BETWEEN SMART BOARD & BLACK BOARD IN GENERAL MATHEMATICS BOOK 1 & 2 AMONG IRANIAN HIGH SCHOOL

Nilam Shrestha*
(Ullens School)
EFFECT OF GEOGEBRA SIMULATION IN TEACHING DIFFERENTIAL CALCULUS IN INTERNATIONAL BACCALAUREATE DIPLOMA PROGRAM

Jaime Carvalho Silva*
(University of Coimbra)
USING THE GRAPHING CALCULATOR IN A DIGITAL WORLD
TSG 44 – Distance learning, e-learning, blended learning

Co-chairs: Rúbia Barcelos Amaral (Brazil), Veronica Hoyos (Mexico)
Team members: Els de Geest (UK), Jason Silverman (USA), Rose Vogel (Germany)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: I: blue, Philosophical Tower, room 206

Session Chair: Rose Vogel

Presentations: Jonathan Todd Lee*
(Elon University)

TECHNOLOGY BARRIERS FOR A FLIPPED MASTERY CYCLE CALCULUS II CLASS

Maria Estela Navarro (1), Veronica Hoyos* (2), Victor Raggi (3),
William Gallardo (4), Sergio Vazquez (5)
(1: Universidad Pedagógica Nacional; 2: Universidad Pedagógica Nacional;
3: Universidad Pedagógica Nacional; 4: Universidad Pedagógica Nacional;
5: Universidad Pedagógica Nacional)
HYBRID LEARNING ENVIRONMENTS MOOC OF DIFFERENTIAL AND INTEGRAL CALCULUS (A PROJECT)

Bijeta Kumar, Bibhya Sharma*
(The University of the South Pacific)

SUCCESS OF THE FIRST YEAR AT-RISK STUDENTS IN UNIVERSITY MATHEMATICS COURSES THROUGH ADAPTIVE INTERVENTIONS

Yasuyuki Nakamura* (1), Tetsuya Taniguchi (2), Kentaro Yoshitomi (3),
Shizuka Shirai (4), Tetsuo Fukui (4), Takahiro Nakahara (6)
(1: Nagoya University; 2: Nihon University; 3: Osaka Prefecture University; 4: Mukogawa Women’s University;
5: Sangensha LLC.)
STACK PROJECT IN JAPAN; ITEM BANK SYSTEM, MATH INPUT INTERFACE AND QUESTION SPECIFICATION

Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: I: blue, Philosophical Tower, room 206

Session Chair: Veronica Hoyos

Presentations: Maxima Joyosa Acelajado*
(De La Salle University – Dasmarinas)

FLIPPED TEACHING APPROACH IN COLLEGE ALGEBRA: COGNITIVE AND NONCOGNITIVE GAINS

Maman Fathurohman*, Hepsii Nindiasari, Nurul Anriani, Aan Subhan Pamungkas
(Universitas Sultan Ageng Tirtayasa)
THE DEVELOPMENT OF TECHNOLOGY-BASED KIT FOR USE BY MATHEMATICS TEACHERS

Eugenia Taranto* (1), Virginia Alberti (2), Sara Labasin (3)
MATH MOOC UNITO: A PROGRAM FOR TEACHERS DESIGNED BY TEACHERS
TSG 45 – Knowledge in / for teaching mathematics at primary level

Co-chairs: Carolyn Maher (USA), Peter Sullivan (Australia)
Team members: Hedwig Gasteiger (Germany), Soo Jin Lee (Korea)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: E: mint, Economical Building, room 5018

Session Chair: Peter Sullivan
Presentations: Ismail Özgür Zembat (1), Ebru Bayram* (2)
(1: Mevlana (Rumi) University; 2: Ay e Hüseyin Özkan Middle School)
WHAT IT MEANS TO HAVE A SPECIALIZED CONTENT KNOWLEDGE OF MEASUREMENT CONCEPTS

Ian Campton*, Julie-Ann Edwards (University of Southampton)
FRAGMENTED PIECES: THE MATHEMATICAL CONTENT KNOWLEDGE OF PRIMARY SCHOOL TEACHERS

Lorraine Bernadette Harbison* (1), Joseph Augustine Harbison (2)
(1: Church of Ireland College of Education; 2: University of Dublin)
MATHEMATICS RESULTS AT SCHOOL COMPLETION AND BASIC COMPETENCY IN INITIAL TEACHER EDUCATION STUDENTS

Jessica Hoth*, Martina Döhrmann (University of Vechta)
PROFESSIONAL COMPETENCIES OF MATHEMATICS TEACHERS AND THEIR RELATION TO CREATIVITY AND GIFTEDNESS

Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: E: mint, Economical Building, room 5018

Session Chair: Hedwig Gasteiger
Presentations: Dilek Girit*, Didem Akyüz (Middle East Technical University)
MATHEMATICAL KNOWLEDGE FOR TEACHING OF PATTERNS: A CASE STUDY OF MIDDLE SCHOOL MATHEMATICS TEACHER

Cheng-Yao Lin*, Eunmi Joung, Miran Byun (Southern Illinois University)
PRE-SERVICE TEACHERS’ CONCEPTUAL AND PROCEDURAL KNOWLEDGE OF DECIMAL OPERATIONS

Rachael Eriksen Brown (1), Gili Gal Nagar (2), Chandra Hawley Orrill* (2), Travis Weiland (2), James Burke (2)
(1: Penn State University- Abington; 2: UMass Dartmouth)
CONSIDERING TEACHER KNOWLEDGE: A CASE STUDY OF PROPORTIONAL REASONING IN AND OUT OF THE CLASSROOM

Xiong Wang* (University of Alberta)
THE CONCEPT STUDY OF EQUIVALENT FRACTIONS: KNOWLEDGE AND KNOWING FOR TEACHING
James Burke* (1), Chandra Orrill (1), Gili Gal Nagar (1), Travis Weiland (1), Rachael Eriksen Brown (2)  
(1: University of Massachusetts Dartmouth; 2: Penn State University-Abington)  
ADDRESSING COHERENCE OF TEACHER’S KNOWLEDGE RELATING FRACTIONS AND RATIOS WITH EPISTEMIC NETWORK ANALYSIS

Reyhan Tekin Sitrava* (1), Mine Isıksal-Bostan (2)  
(1: Hacettepe University; 2: Middle East Technical University)  
A STUDY ON INVESTIGATING MIDDLE SCHOOL TEACHERS’ CURRICULUM KNOWLEDGE: THE CASE OF THE VOLUME OF PYRAMIDS

Third Session: Friday, 29 July 2016, 15.00 – 16.00  
Location: E: mint, Economical Building, room 5018  

Session Chair: Carolyn A. Maher  
Presentations: Lawan Abdulhamid*  
(University of the Witwatersrand)  
SUPPORTING ‘ELABORATION’ IN PRIMARY SCHOOL TEACHERS’ HANDLING OF INCORRECT ANSWERS IN MATHEMATICS CLASSROOMS

Mi Yeon Lee* (1), Dionne Cross Francis (2)  
(1: Arizona State University; 2: Indiana University)  
INVESTIGATING THE RELATIONSHIP BETWEEN ELEMENTARY TEACHERS’ PERCEPTION ABOUT THE USE OF STUDENTS’ THINKING AND THEIR PRO

Adair Mendes Nacarato*  
(University São Francisco)  
LEARNING TO TEACH MATHEMATICS IN A COMMUNITY OF INQUIRY

Libuse Samkova* (1), Marie Ticha (2)  
(1: Faculty of Education; 2: Institute of Mathematics of the Czech Academy of Sciences)  
ON THE WAY TO ENHANCE FUTURE PRIMARY TEACHERS’ BELIEFS ABOUT MATHEMATICS VIA INQUIRY BASED UNIVERSITY COURSES

Fourth Session: Friday, 29 July 2016, 16.30 – 18.00  
Location: E: mint, Economical Building, room 5018  

Session Chair: Soo Jin Lee  
Presentations: Arne Jakobsen*, Mercy Kazima  
(University of Stavanger)  
TESTING VALIDITY OF MATHEMATICAL TASKS OF TEACHING IN MALAWI PRIMARY SCHOOLS

Nadia Diogo Ferreira*  
(Instituto de Educação)  
THE ROLE OF REPRESENTATIONS IN THE PRACTICE OF THREE PROSPECTIVE ELEMENTARY SCHOOL TEACHERS

Joserlene Lima Pinheiro* (1), Marcilia Chagas Barreto (2)  
(1: Universidade da Integração Internacional da Lusofonia Afro-Brasileira; 2: Universidade Estadual do Ceará)  
REGISTERS OF SEMIOTICS REPRESENTATION BY MATHEMATICS TEACHERS: ASPECTS RELATED TO PROBLEM SOLVING
Charalambos Charalambous, Sofia Agathangelou*, Maria Papacharalambous
(University of Cyprus)
DEVELOPING TEACHERS’ MATHEMATICAL KNOWLEDGE FOR TEACHING:
(RE)CONSIDERING THE ROLE OF INSTRUCTION

Reidar Mosvold, Janne Fauskanger*
(University of Stavanger)
MATHEMATICAL TASKS OF TEACHING AND THE PROFESSIONAL AND
CULTURAL ASPECTS OF TEACHING

Francesca Neri Macchiaverna*, Ana Maria Millán Gasca
(Roma Tre University)
THE ROLE OF STAGE PRESENCE IN TEACHING MATH

TSG 46 – Knowledge in/for teaching mathematics at secondary level

Co-chairs: Ruhama Even (Israel), Xinrong Yang (China)
Team members: Nils Buchholtz (Germany), Charalambos Charalambous (Cyprus),
Tim Rowland (Great Britain)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: I: blue, Philosophical Tower, room 701

Group A – Session Chair: Heather Howell
Presentations: Hyman Bass*
(University of Michigan)
KNOWLEDGE OF MATHEMATICAL CONNECTIONS FOR TEACHING

Sven Schueler*, Bettina Roesken-Winter
(Humboldt-Universität zu Berlin)
MEASURING MATHEMATICS TEACHERS’ PROFESSIONAL KNOWLEDGE
IN PROBABILITY AND STATISTICS

Sotiros Zoitsakos* (1), Theodossios Zachariades (1), Charalampos Sakonidis (2)
(1: University of Athens; 2: Democritus University of Thrace)
THE INNER AND OUTER HORIZON OF TEACHERS’ MATHEMATICAL KNOWLEDGE
IN ACTION: THE CASE OF AN INFINITE DECIMAL NUMBER

Thorsten Scheiner*
(University of Hamburg)
ARE WE TRAPPED IN OLD HABITS? REVISITING WAYS OF THINKING IN
CONCEPTUALIZING TEACHER KNOWLEDGE

Location: I: blue, Philosophical Tower, room 706

Group B – Session Chair: Stefanie Schumacher
Presentations: Marita Friesen* (1), Sebastian Kuntze (1), Markus Vogel (2)
(1: Ludwigsburg University of Education; 2: Heidelberg University of Education)
ASSESSING PRE-SERVICE TEACHERS’ COMPETENCE OF ANALYSING CLASSROOM
SITUATIONS: A VIGNETTE-BASED TEST
Florence Mamba
(University of Malawi)
A PRESERVICE SECONDARY SCHOOL TEACHER’S KNOWLEDGE OF SOLVING QUADRATIC EQUATIONS

Olivia Claire Fitzmaurice (1), Patrick Johnson* (1), Niamh O’Meara (2), Sean Lacey (3)
(1: University of Limerick; 2: EPI*STEM; 3: Cork Institute of Technology)
INSIGHTS INTO PRESERVICE TEACHERS’ MISCONCEPTIONS OF LINEAR EQUATIONS

Lena Pankow*, Kirsten Benecke
(University of Hamburg)
VALIDATION STUDY TEDS-FOLLOW UP: IDENTIFICATION OF STUDENT ERRORS WITHIN A TIMED TEST

Second Session: Tuesday, 26 July 2016, 16.30 – 18.00
Location: I: blue, Philosophical Tower, room 701

Group A – Session Chair: Hyman Bass
Presentations: Miguel Montes* (1), Carlos Miguel Ribeiro (2), José Carrillo (1)
(1: University of Huelva; 2: Centro de Investigação sobre o Espaço e as Organizações (CIEO))
TOWARDS A TOPOLOGY OF MATHEMATICAL CONNECTIONS IN TEACHER KNOWLEDGE

Heather Howell* (1), Yvonne Lai (2), Geoffrey Charles Phelps (1)
(1: Educational Testing Service; 2: University of Nebraska – Lincoln)
CONCEPTUALIZING MATHEMATICAL KNOWLEDGE FOR TEACHING AT SECONDARY LEVEL: DO PRIMARY MODELS EXTEND?

Casey W. Hawthorne, Randolph A. Philipp*
(San Diego State University)
RECONCEPTUALIZING A MATHEMATICAL DOMAIN AROUND REASONING: CONSIDERING TEACHERS’ PERSPECTIVES ABOUT INTEGERS

Anika Dreher*, Anke Lindmeier, Aiso Heinze
(IPN Kiel)
BRIDGING THE GAP BETWEEN ACADEMIC AND SCHOOL MATHEMATICS – A KEY CHALLENGE FOR SECONDARY TEACHERS’ MATHEMATICAL CK

Location: I: blue, Philosophical Tower, room 706

Group B – Session Chair: John Suffolk
Presentations: Christoph Ableitinger*
(Universität Wien)
TUTUORS’ QUALIFICATION IN RESPONDING TO PUPILS DURING PRIVATE LESSONS

Stefanie Schumacher*, Michael Kleine
(Bielefeld University)
BEST TEACHER: A TEST INSTRUMENT FOR SECONDARY SCHOOL TEACHERS’ PROFESSIONAL KNOWLEDGE IN DESCRIPTIVE STATISTICS

John Suffolk*
(Retired)
TEACHING STAGES AND STYLES
Maria De los Angeles Cruz Quiñones* (1), Mourat Tchoshanov (2),
Maria Dolores Cruz Quiñones (3)
(1: Universidad Autonoma de Ciudad Juarez; 2: University of Texas at El Paso;
3: New Mexico State University)
A MIXED METHODS STUDY OF THE MATHEMATICAL TEACHER CONTENT
KNOWLEDGE AND KNOWING-TO ACT AT THE MIDDLE SCHOOL LEVEL

David Glassmeyer* (1), Aaron Brakoniecki (2), Julie Amador (3)
(1: Kennesaw State University; 2: Boston University; 3: University of Idaho)
CHALLENGING TEACHERS’ ASSUMPTOINS OF TRIGONOMETRY THROUGH SLOPE RATIOS

Nils Buchholtz*
(University of Hamburg)
CONCEPTUALIZING MATHEMATICAL PEDAGOGICAL CONTENT KNOWLEDGE
FOR STUDIES ON TEACHERS’ PROFESSIONAL KNOWLEDGE

Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: I: blue, Philosophical Tower, room 701

Group A – Session Chair: Inah Ko
Presentations: Rui Zhao*
(Jinzong University)
AN INVESTIGATION OF RPE-SERVICE SECONDARY TEACHERS’ STATISTICAL
KNOWLEDGE FOR TEACHING AND BELIEFS ABOUT STATISTICS

Inah Ko* (1), Patricio Herbst (1), Yung Chi Lin (2)
(1: University of Michigan; 2: National Changhua University of Education)
SUBJECT MATTER KNOWLEDGE OF GEOMETRY NEEDED IN TASKS OF TEACHING
AND TEACHERS’ GEOMETRY TEACHING EXPERIENCE

Isabelle Demonty*, Joelle Vlassis
(University of Luxembourg)
DEVELOPING A TOOL FOR ASSESSING ELEMENTARY ALGEBRAIC KNOWLEDGE
FOR TEACHING: A TWOFOLD PERSPECTIVE

Location: I: blue, Philosophical Tower, room 706

Group B – Session Chair: Eileen Murray
Presentations: Eileen Murray* (1), Nicholas Wasserman (2)
(1: Montclair State University; 2: Teachers College Columbia University)
CONNECTING SOLVING EQUATIONS IN AN ADVANCED CONTEXT TO SECONDARY
MATHEMATICS INSTRUCTION

Shikha Takker*, K. Subramaniam
(Homi Bhabha Centre for Science Education)
CHANGING TEACHER KNOWLEDGE-IN-PRACTICE: THE CASE OF DECIMAL FRACTIONS

Mirosława Ewa Sajka*, Roman Rosiek
(Pedagogical University of Cracow)
USING EYETRACKING FOR RESEARCH ON “MATHEMATICAL CULTURE”
OF PRESERVICE TEACHERS
Lisnet Elizabeth Mwadaangati*  
(University of Malawi) 
**USING PROOF ANALYSIS TO EXAMINE KNOWLEDGE FOR TEACHING GEOMETRIC PROOFS.**

**TSG 47 – Pre-service mathematics education of primary teachers**

Co-chairs: Keiko Hino (Japan), Gabriel Stylianides (UK)  
Team members: Katja Eilerts (Germany), Caroline Lajoie (Canada), David Pugalee (USA)

**First Session: Tuesday, 26 July 2016, 15.00–16.00**
**Location: G: green, Social Science Building, room A215**

**Group A – Session Chair: David Pugalee**
Presentations: George Gadanidis*, Immaculate Namukasa  
(Western University)  
**DEVELOPING AND RESEARCHING ONLINE MATHEMATICS TASKS AND RESOURCES FOR K-6 PRESERVICE TEACHERS**

Ryan Glenn Zonnefeld*, Valorie Lynn Zonnefeld  
(Dordt College)  
**TECHNOLOGY-INFUSED CLASSROOMS: BRIDGING THE GAP IN PRE-SERVICE MATHEMATICS TEACHER PREPARATION**

Anne Marie S. Marshall* (1), Kadian M. Callahan (2)  
(1: Berry College; 2: Kennesaw State University)  
**MATHEMATICS TEACHER EDUCATORS’ KNOWLEDGE DOMAINS WHEN COLLABORATIVELY PLANNING FOR PRE-SERVICE PRIMARY TEACHERS**

**Location: G: green, Social Science Building, room A315**

**Group B – Session Chair: Katja Eilerts**
Presentations: Gabriel Huszar* (1), Mar Moreno (2), Assumpta Estrada (1), Ivan Barbero (1)  
(1: University of Lleida; 2: University of Alicante)  
**AN EXPLORATORY STUDY ABOUT THE RESPONSES OF THE PROSPECTIVE PRIMARY TEACHERS USING THE CONCEPTS OF MEASUREMENT IN MATHS**

Mine Isıksal-Bostan*, Seçil Yemen-Karpuzcu  
(Middle East Technical University)  
**PROSPECTIVE MIDDLE SCHOOL MATHEMATICS TEACHERS’ KNOWLEDGE ON CYLINDER AND PRISM: GENERATING DEFINITIONS AND RELATIONSHIP**

**Second Session: Tuesday, 26 July 2016, 16.30–18.00**
**Location: G: green, Social Science Building, room A215**

**Group A – Session Chair: Gabriel Stylianides**
Presentations: Annette Hessen Bjerke*  
(Oslo and Akershus University)  
**MEASURING SELF-EFFICACY IN TEACHING MATHEMATICS**
Oral Communications

Lenni Haapasalo*, Pasi Eskelinen
(University of Eastern Finland)
ASSESSING TEACHER EDUCATION THROUGH NCTM STANDARDS AND SUSTAINABLE ACTIVITIES

Siyin Yang*
(California State University Long Beach)
A COMPARISON OF CURRICULUM STRUCTURE FOR PROSPECTIVE ELEMENTARY MATH TEACHER PROGRAMS BETWEEN THE UNITED STATES AND CHIN

Gabriela Valverde Soto*
(University of Costa Rica)
ENHANCING THE MATHEMATICS COMPETENCIES OF FUTURE ELEMENTARY TEACHERS: REVIEW OF A DESIGN RESEARCH

Victoria Kofman (2), Sayonita Ghosh Hajra (3), Oleg Ostrovskiy* (1)
(1: The University of Illinois at Chicago; 2: Stella Academy; 3: University of Utah)
VISUAL REPRESENTATIONS OF WORD PROBLEMS

Location: G: green, Social Science Building, room A315

Group B – Session Chair: Keiko Hino
Presentations: Viren Ramdhany*
(Wits University)
THE ROLE OF RECOGNITION AND REALISATION RULES IN THE PREPARATION OF PRIMARY MATHEMATICS TEACHERS

Macarena Larrain* (1,2)
(1: Universidad de los Andes; 2: University of Hamburg)
DIAGNOSTIC COMPETENCE OF FUTURE PRIMARY TEACHERS – HOW CAN IT BE FOSTERED?

Ginger A. Rhodes*, Shelby P. Morge, Heidi J. Higgins
(University of North Carolina Wilmington)
PRESERVICE TEACHERS’ VIEWS OF MATHEMATICS, MATHEMATICS TEACHING, AND AUTHORITY

Cindy Xin*, Petra Menz
(Simon Fraser University)
METACOGNITIVE KNOWLEDGE, CONFIDENCE AND BELIEFS TARGETED THROUGH REFLECTIVE WRITING IN MATHEMATICS

Pamela Alejandra Reyes-Santander (1), Martin Höfele* (2)
(1: Pontificia Universidad Católica de Valparaiso; 2: Bertolt Brecht Realschule)
GRUNDVORSTELLUNGEN (GV) AND BELIEFS OF PRE-SERVICE TEACHERS ABOUT TEACHING ADDITION
Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: G: green, Social Science Building, room A215

Group A – Session Chair: Katja Eilerts
Presentations: Ronald Keijzer* (1), Gerard Boersma (2)
(1: Hogeschool iPabo; 2: HAN)
LOW PERFORMERS IN MATHEMATICS IN PRIMARY TEACHER EDUCATION

Irina Lyublinskaya*
(College of Staten Island)
ARE YOU SMARTER THAN A 4TH GRADER? COMPARING MATHEMATICS CONTENT KNOWLEDGE OF ELEMENTARY TEACHERS AND 4TH GRADE STUDENTS

Aitor Villarreal*, Lluís Albarracín, Núria Gorgorió
(Universitat Autònoma de Barcelona)
BASIC MATHEMATICAL KNOWLEDGE OF STUDENTS ENROLLING FOR PRIMARY EDUCATION UNIVERSITY DEGREES

Location: G: green, Social Science Building, room A315

Group B – Session Chair: Caroline Lajoie
Presentations: Ronaldo Barros Ripardo Ripardo*, Claudete Marques de Medeiros Medeiros, Tadeu Oliver Gonçalves Gonçalves
(Universidade Federal do Pará)
BECOMING A MATH TEACHER: THE SUPERVISED INTERNSHIP AS POSSIBLE WAY FOR REFLEXIVE PRACTICE.

Bilge Yurekli*
(Gazi University)
QUALITATIVE INVESTIGATION OF FIELD EXPERIENCES IN TERMS OF PRE-SERVICE TEACHERS’ SELF-EFFICACY FOR TEACHING MATHEMATICS

Erin Moss*
(Millersville University of Pennsylvania)
RELATIONSHIPS BETWEEN VIDEO CLUB PARTICIPATION AND IDENTITY IN PRESERVICE ELEMENTARY TEACHERS

Filip Roubicek* (1), Alena Hospesova (2)
(1: Institute of Mathematics of the Czech Academy of Sciences; 2: University of South Bohemia in Ceske Budejovice)
PROBLEMS FOR INQUIRY BASED MATHEMATICS EDUCATION POSED BY FUTURE TEACHERS

Fourth Session: Friday, 29 July 2016, 16.30 – 18.00
Location: G: green, Social Science Building, room A215

Group A – Session Chair: David Pugalee
Presentations: Cory A. Bennett (1), Mary Pat Sjostrom* (2)
(1: Idaho State University; 2: Winthrop University)
ENGAGING PROSPECTIVE ELEMENTARY TEACHERS’ IN PROBLEM SOLVING TO INFORM THEIR UNDERSTANDING OF TEACHING PROBLEM SOLVING
Hanan Innabi*  
(Free Lancer)  
STRATEGIES FOR TEACHING THINKING SKILLS: PRE-SERVICE COURSE FOR MATHEMATICS EDUCATION CANDIDATES AT UAE UNIVERSITY

Yupadee Panarach*  
(Kamphaeng Phet Rajabath University)  
THE DEVELOPMENT PROCESS OF MATHEMATICS PROJECT BY USING DEMING CYCLE FOR PRE-SERVICE TEACHER

Location: G: green, Social Science Building, room A315

Group B – Session Chair: Caroline Lajoie  
Presentations: Yi Jung Lee*  
(University of Georgia)  
PRE-SERVICE ELEMENTARY SCHOOL TEACHERS’ PERCEIVED DIFFICULTIES IN DEVELOPING THEIR KNOWLEDGE FOR TEACHING MATHEMATICS

Ratera Safiel Mayar*  
(Tanzania Institute of Education)  
IMPACT OF MATHEMATICS FOR TEACHING THROUGH CONCEPT STUDY ON PRIMARY SCHOOL PRE-SERVICE TEACHERS’ PROFESSIONAL KNOWLEDGE

Ana Chiummo, Emilio Celso de Oliveira*  
(Universidade Paulista)  
TEACHER’S KNOWLEDGE: TEACHING EXPERIENCES AT GRADUATION

Gudny Helga Gunnarsdottir, Gudbjorg Palsdottir*  
(University of Iceland)  
SPECIALISED COURSES IN MATHEMATICS TEACHER EDUCATION
TSG 48 – Pre-service mathematics education of secondary teachers

Co-chairs: Rongjin Huang (USA), Marilyn E. Strutchens (USA)
Team members: Leticia Losano (Argentina), Despina Potari (Greece), Björn Schwarz (Germany)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: G: green, Social Science Building, room B137

Group A – Session Chair: Marilyn Strutchens
Presentations: Lars Holzäpfel*, Andreas Schulz
(PH Freiburg)
SUCCESSFULLY LINKING THEORY AND PRACTICE THROUGH UNIVERSITY LEVEL SUPERVISION OF THE INTERNSHIP

Ruthmae Sears* (1), Patricia Brosnan (2), Maureen Grady (3), Charity Cayton (3), Jennifer Oloff-Lewis (4), Stephanie Biagetti (5), Jami Stone (6), Janet Andreasen (7), Johannah Maynor (8), Karen Hollebrands (9), Cathy Spencer (10), Laurie Riggs (11), Juli (1: University of South Florida; 2: Ohio State University; 3: East Carolina University; 4: California State University; 3: East Carolina University; 4: California State University; 5: California State University; 6: Black Hills State University)
A COLLABORATIVE EFFORT TO EXAMINE CO-PLANNING AND CO-TEACHING DURING CLINICAL EXPERIENCES

Limin Jao*
(McGill University)
THE IMPORTANT THING ABOUT SECONDARY PRE-SERVICE TEACHER EDUCATION: PUSHING PEDAGOGICAL BOUNDARIES

Location: G: green, Social Science Building, room B537

Group B – Session Chair: Despina Potari
Presentations: Burçin Gökkurt* (1), Yasin Soylu (2)
(1: Bartin University; 2: Ataturk University)
EXAMINATION OF MIDDLE SCHOOL MATHEMATICS TEACHERS’ PEDAGOGICAL CONTENT KNOWLEDGE IN TERMS OF TWO COMPONENTS: THE SAMPLE

Samira Zaidan* (1), Vinicio Santos (2)
(1: Faculdade de Educação – UFMG; 2: Faculdade de Educação – USP)
THE “PEDAGOGICAL CONTENT KNOWLEDGE” AS THE FOCUS, NOT A COMPLEMENT, OF THE INITIAL FORMATION OF MATHEMATICS TEACHERS

Deming Yan*, Hongwei Wang
(Henan Institute of Education)
TRAINING OF TEACHING ABILITY OF MATHEMATICS NORMAL STUDENTS – CASE STUDY OF TWO EXCELLENT MATHEMATICS NORMAL STUDENTS

Evangeline F. Golla*
(Philippine Normal University)
EXAMINING PRESERVICE SECONDARY TEACHERS’ MATHEMATICS KNOWLEDGE FOR TEACHING AND CHALLENGES IN IMPROVING TEACHER QUALITY
Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: G: green, Social Science Building, room B137

**Group A – Session Chair: W. Gary Martin**
Presentations: Mikhail Epshtein* (1), Irina Lyublinskaya (2), Stephanie Sheehan (2)
(1: St. Petersbourg State University; 2: College of Staten Island)
SHORT-TERM INTERNATIONAL PROGRAM FOR PRE-SERVICE STEM TEACHERS AS A FORM OF PROFESSIONAL DEVELOPMENT

Wellington Lima Cedro*
(Universidade Federal de Goiás)
REFLECTING ON SUPERVISED TEACHING PRACTICE EXPERIENCES: THE MATHEMATICS TEACHER’S EDUCATION UNDER THE SPOTLIGHT

Mônica Ester Villarreal*, Cristina Beatriz Esteley
(Facultad de Matemática)
PRE-SERVICE TEACHERS’ NARRATIVES ABOUT THEIR FIRST TEACHING PRACTICES

Location: G: green, Social Science Building, room B537

**Group B – Session Chair: Despina Potari**
Presentations: Christian Klostermann*
(Carl von Ossietzky University Oldenburg)
PROSPECTIVE TEACHERS’ CAPABILITIES OF ANTICIPATIONS REGARDING STUDENTS’ ARGUMENTATION DURING REASONING TASKS

Erica Dorethea Spangenberg*, Chris Myburgh
(University of Johannesburg)
PRE-SERVICE TEACHERS’ PERCEPTIONS OF THEIR OWN BELIEFS ON THE NATURE OF MATHEMATICS IN A SOUTH AFRICAN CONTEXT

Natalie Hock*, Rita Borromeo-Ferri
(University of Kassel)
PROMOTING DIAGNOSTIC COMPETENCIES OF PRE-SERVICE TEACHERS BY CONNECTING JOINT SEMINARS WITH IN-SERVICE TEACHERS

Hannah Heinrichs*
(Universität Hamburg)
ASSESSING AND PROMOTING FUTURE TEACHERS’ DIAGNOSTIC COMPETENCE

Cheryl Kumpf Van Ness*
(Rutgers University Graduate School of Education)
CREATING AND USING VIDEO NARRATIVES FOR SECONDARY PRESERVICE TEACHERS’ STUDYING OF ARGUMENTATION

Third Session: Friday, 29 July 2016, 15.00–16.00
Location: G: green, Social Science Building, room B137

**Group A – Session Chair: Joao Pedro da Ponte**
Presentations: Talma Leviatan* (1), Laure Barthel (2)
(1: Tel Aviv university; 2: Hadassah College Jerusalem)
NUMBER SYSTEMS – A KEY “BRIDGING” COURSE IN TEACHERS’ TRAINING PROGRAM
Eun Jung*  
(University of Georgia)  
ISSUES IN FRACTIONAL CURRICULA: PRESERVICE TEACHERS’ UNDERSTANDING OF FRACTIONS AS OPERATORS

Eric Kuennen*  
(University of Wisconsin Oshkosh)  
PRE-SERVICE SECONDARY TEACHERS’ MATHEMATICS KNOWLEDGE AND BELIEFS IN THE US, GERMANY AND CHINA

Sergey Atanasyan* (1), Nataliia Chuikova (1), Sergey Polikarpov (1), Ildar Safuanov (2)  
(1: Moscow Pedagogical State University; 2: Moscow City Pedagogical University)  
NEW APPROACHES TO MATHEMATICS TEACHERS TRAINING IN MOSCOW

Meltem Koçak, Yasin Soylu*  
(Atatürk University)  
ANALYSIS OF THE PROSPECTIVE TEACHERS OF MATHEMATICS’ STRATEGY KNOWLEDGE IN RELEVANCE WITH THE ALGEBRA FORMULAS

Location: G: green, Social Science Building, room B537

Group B – Session Chair: Rongjin Huang  
Presentations: Wolfgang Weigel*  
(Universität Würzburg)  
PRODUCING VIDEOS – A LITTLE HELPER IN MATHEMATICS TEACHER EDUCATION

Kyomi Takuma (1), Seiji Moriya* (2)  
(1: Ritsumeikan Uji Junior & Senior High School; 2: Tamagawa University)  
POSSIBILITY OF INTERNATIONAL COOPERATIVE DISTANCE LECTURE AND SEMINAR FOR TRAINING MATHEMATICS TEACHERS

Marie-Elene Bartel*, Jürgen Roth  
(University Landau)  
VIVIAN – A VIDEOTOOL TO PROMOTE AND ASSESS DIAGNOSTIC SKILLS OF PRESERVICE TEACHERS

Fourth Session: Friday, 29 July 2016, 16.30–18.00  
Location: G: green, Social Science Building, room B137

Session Chair: Leticia Losano  
Presentations: Annatoria Zanele Ndlovu*  
(University of KwaZulu Natal)  
A GENETIC DECOMPOSITION OF CRAMER’S RULE

Ceneida Fernández* (1), Mar Moreno (1), M. Luz Callejo (1), Gloria Sánchez-Matamoros (2)  
(1: University of Alicante; 2: University of Sevilla)  
HOW PROSPECTIVE TEACHERS ANTICIPATE STUDENTS ANSWERS TO PROBLEMS INVOLVING THE LIMIT CONCEPT

Catherine Bénétou (1), Sarah Bleiler-Baxter (2), Gladis Kersaint (1), Milé Krajcevski* (1)  
(1: University of South Florida; 2: Middle Tennessee State University)  
NAVIGATING CO-TEACHING: PERSPECTIVES FROM MATHEMATICIANS, MATHEMATICS EDUCATORS, AND STUDENTS
DEVELOPING PRE-SERVICE TEACHERS’ ABILITIES TO NOTICE INQUIRY OPPORTUNITIES IN MATHEMATICAL TASKS

Meltem Koçak*, Yasin Soylu
(Atatürk University)
ANALYSIS OF PROSPECTIVE MATHEMATICS TEACHERS’ TEACHING STRATEGY KNOWLEDGE ON GEOMETRIC FORMULAS

TSG 49 – In-service education and professional development of primary mathematics teachers

Co-chairs: Akihiko Takahashi (USA), Leonor Varas (Chile)
Team members: Toshiakira Fuji (Japan), Kim Ramatlapana (Botswana), Christoph Selter (Germany)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: G: green, Social Science Building, room B130

Session Chair: Leonor Varas
Presentations: Hatice Aydan Kaplan*, Ziya Argun
(Gazi University)
KNOWLEDGE FOR DIAGNOSING STUDENT THINKING: HOW IT AFFECTS DIAGNOSTIC COMPETENCE?

Zetra Hainul Putra* (1,2)
(1: Faculty of Teacher Training and Education; 2: Department of Science Education)
EVALUATION OF ELEMENTARY TEACHERS’ KNOWLEDGE ON FRACTION MULTIPLICATION USING ANTHROPOLOGICAL THEORY OF THE DIDACTIC

Dichen Wang*
(The Hong Kong Institute of Education)
PROBING INTO THE WAYS TEACHERS LEARN MATHEMATICS AND ITS TEACHING

Lynda J. McCoy*
(California State University Long Beach)
AN EXPERIENTIAL LEARNING APPROACH TO DEVELOPING IN-SERVICE ELEMENTARY TEACHERS’ CONTENT KNOWLEDGE FOR TEACHING MATHEMATICS

Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: G: green, Social Science Building, room B130

Session Chair: Toshiakira Fuji
Presentations: April Dawn Strom (1), Patrick Kimani* (2), Laura Watkins (2)
(1: Scottsdale Community College; 2: Glendale Community College)
AMPING UP PROFESSIONAL DEVELOPMENT THROUGH A COLLABORATIVE COMMUNITY OF LEARNERS (CCOL)

Kalaivani Shanmugam* (1), Lim Chap Sam (2), Md Razhi (1)
(1: Institut Pendidikan Guru Kampus Tuanku Bainun; 2: Universiti Sains Malaysia)
INSIGHTS OF LESSON STUDY PROCESS FROM MALAYSIAN MATHEMATICS TEACHERS: A CASE STUDY
Nor Azura Abdullah*, Frederick K. S. Leung
(The University of Hong Kong)
HIGHLIGHTING TEACHER’S VALUES IN TEACHING PRIMARY SCHOOL MATHEMATICS
DURING LESSON STUDY PROCESS

Thandive Lilian Hlam*
(NMMU)
A TEACHER COLLECTIVE AS A PROFESSIONAL DEVELOPMENT APPROACH TO
PROMOTE FOUNDATION PHASE MATHEMATICS TEACHING

Third Session: Friday, 29 July 2016, 15.00 – 16.00
Location: G: green, Social Science Building, room B130
Session Chair: Christoph Selter
Presentations: Luise Eichholz*
(TU Dortmund)
“MATHE KOMPAKT”– DESIGN AND EVALUATION OF AN IN-SERVICE COURSE
FOR OUT-OF-FIELD MATHEMATIC TEACHERS

Gabriela Gomez Pasquali*
(OMAPA)
THE IMPACT OF THE MATHEMATIC OLYMPIADS IN PARAGUAYAN TEACHERS

Calvin Zakaria Swai* (1), Andrew L. Binde (2)
(1: University of Dodoma; 2: University of Dodoma)
A STUDY OF PRIMARY SCHOOL TEACHERS’ BELIEFS OF PEDAGOGICAL STRATEGIES
IN MATHEMATICS LESSONS IN TANZANIA

Reforming elementary School Mathematics Instruction Through
Classroom Discourse and Cooperative Learning

Fourth Session: Friday, 29 July 2016, 16.30 – 18.00
Location: G: green, Social Science Building, room B130
Session Chair: Kim Ramatlapana
Presentations: Monica Smith Karunakaran (2), Anne Elizabeth Adams* (1),
Brittany Wnek (1), Veronica Blackham (1), Peter Klosterman (2), Libby Knott (2), Rob Ely (1)
(1: University of Idaho; 2: Washington State University)
MAKING MATHEMATICAL REASONING EXPLICIT: RESPONSIVE PD

Jutta Cornelia Reuwsaat Justo*, Kelly da Silva Rebelo, Margarete Fátima Borga,
Janaina Freitas dos Santos, Simone Soares Echeveste
(Universidade Luterana do Brasil)
IN-SERVICE EDUCATION OF PRIMARY MATHEMATICS TEACHERS WITH FOCUS
ON PROBLEM SOLVING

Samantha Quiroz Rivera* (1), Elizenda Castañeda (2), Ruth Rodríguez (2)
(1: Universidad Autónoma de Nuevo León; 2: Tecnológico de Monterrey)
LESS THEORY AND MORE PRACTICE: HOW TO DESIGN A LESSON BASED
IN MATHEMATICAL MODELING?
Marc Husband*, Tina Rapke, Robyn Ruttenberg-Rozen
(York University)
“YES, AND...”: CONCEPTUALIZING AND CHARACTERIZING AUTHORITY AS FLUID IN PROFESSIONAL LEARNING COMMUNITIES

TSG 50 – In-service education, and professional development of secondary mathematics teachers

Co-chairs: Jill Adler (South Africa), Yudong Yang (China)
Team members: Hilda Borko (USA), Konrad Krainer (Austria), Sitti Patahuddin (Australia)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: D: yellow, West Wing Building, room 122

Group A – Session Chair: Jill Adler
Presentations: Erin C. Henrick* (1), Emily C. Kern (1), Paul Cobb (1), Thomas M. Smith (2), Yiming Cao (3)
(1: Vanderbilt University; 2: University of California-Riverside; 3: Beijing Normal University)
DISTRICT AND SCHOOL SUPPORTS FOR AMBITIOUS MATH INSTRUCTION: A DESCRIPTIVE COMPARISON BETWEEN THE U.S. AND CHINA

Malin Lindwall Ehrnlund*
(Linköping University)
MATHEMATICS TEACHERS USING CONCERNS AND NEEDS INFORMED BY PRACTICE AS A LEVER FOR CHANGE

Marlon Casimiro Ebaeguin*, Max Stephens
(The University of Melbourne)
GOING BEYOND COPYISM: A CULTURALLY EMBEDDED IMPLEMENTATION OF LESSON STUDY IN THE PHILIPPINES

Pınar Güner* (1), Didem Akyüz (2)
(1: Istanbul University; 2: Middle East Technical University)
INVESTIGATING THE CONSISTENCY BETWEEN PLANNED AND IMPLEMENTED LESSONS IN THE CONTEXT OF LESSON STUDY

Location: D: yellow, West Wing Building, room 220

Group B – Session Chair: Yudong Yang
Presentations: Thomas Wassong*
(University Paderborn)
MATHEMATICS TEACHERS EDUCATORS’ BELIEFS ABOUT THE ROLE OF CONTENT KNOWLEDGE IN CPD-COURSES

Catherine Paolucci* (1), Maire Ni Riordain (2)
(1: State University of New York at New Paltz; 2: National University of Ireland)
TEACHER DEVELOPMENT WITHIN A PROFESSIONAL DEVELOPMENT PROGRAMME FOR OUT-OF-FIELD MATHEMATICS TEACHERS
Sebastian Kuntze*, Marita Friesen  
(Ludwigsburg University of Education)  
USING SITUATED FORMATS FOR RESEARCH INTO ASPECTS OF  
MATHEMATICS TEACHER EXPERTISE – PROSPECTS AND CHALLENGES

Terry Wan Jung Lin* (1), Kara Jackson (2), Marta Kobiela (1), Zachary Parker (1)  
(1: McGill University; 2: University of Washington)  
DEVELOPING FACILITATION PRACTICES TO SUPPORT SECONDARY MATHEMATICS  
TEACHER LEARNING

Location: D: yellow, West Wing Building, room 222

Group C – Session Chair: Hilda Borko  
Presentations: Mayra Anaharely Sarai Báez Melendres*, Rosa María Farfán Márquez  
(Center for Research and Advanced Studies of the National Polytechnic Institute)  
REFLECTING ON SCHOOL MATHEMATICS: A SOCIOEPISTEMOLOGICAL ROUTE

Firdevs Iclal Karatas* (1), Fatma Tutak (2)  
(1: Middle East Technical University; 2: Bogazici University)  
EXAMINING TURKISH SECONDARY MATHEMATICS TEACHERS’ TECHNOLOGICAL  
PEDAGOGICAL CONTENT KNOWLEDGE

Fiona Faulkner* (1), Ciara Lane (2), Aoife Smith (2)  
(1: Dublin Institute of Technology; 2: University of Limerick)  
A CPD PROGRAMME FOR OUT-OF-FIELD MATHEMATICS TEACHERS IN IRELAND:  
PROGRAMME OUTLINE AND INITIAL EVALUATIONS

Bingxing Shi*, Fei Zhang, Zhaoyun Hu, Yonghui Wang, Jingling Gu, Wei Cheng  
(Beijing Normal University)  
INQUIRY INTO THE STRATEGY OF TEACHER’S PROFESSIONAL DEVELOPMENT

Location: D: yellow, West Wing Building, room 223

Group D – Session Chair: Konrad Krainer  
Presentations: Vanessa Crecci*, Dario Fiorentini  
(University of Campinas)  
PROFESSIONAL DEVELOPMENT WITHIN A BORDERLAND COMMUNITY

Ka Lok Wong*  
(The University of Hong Kong)  
BRINGING RICH TASKS TO THE MATHEMATICS CLASSROOMS IN HONG KONG:  
OPPORTUNITIES AND POTHOLES IN PROFESSIONAL DEVELOPMENT

Owen Hugh Glover*  
(Nelson Mandela Metropolitan University)  
CRITERIA FOR DETERMINING MATHEMATICAL KNOWLEDGE IN A HIGH  
SCHOOLTEACHER EDUCATION PROGRAM – AN AUTO-BIOGRAPHICAL ACCOUNT

Aleksandra Anna Kaplon-Schilis* (1), Irina Lyublinskaya (2)  
(1: The Graduate Center; 2: College of Staten Island)  
DEVELOPING ESSENTIAL UNDERSTANDINGS OF MATHEMATICS FOR  
MIDDLE SCHOOL TEACHERS THROUGH ANALYSIS OF STUDENT MISCONCEPTIONS
Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: D: yellow, West Wing Building, room 122

Group A – Session Chair: Sitti Patahuddin
Presentations: Rongjin Huang, Angela T. Barlow, Melaine Haupt*
(Middle Tennessee State University)
DEVELOPING HIGH-LEVERAGE PRACTICES AS DELIBERATE PRACTICE THROUGH LESSON STUDY

Theodosia Prodromou*
(UNE)
MICRO- AND MACRO-LEVELS OF MATHEMATICAL COMPLEXITIES WHEN DECOMPRESSING AND TRIMMING MATHEMATICAL KNOWLEDGE WITH THE USE

Katja Maass* (1), Malcolm Swan (2), Anna-Maria Aldorf (1)
(1: University of education Freiburg; 2: University of Nottingham)
PROFESSIONAL DEVELOPMENT FOR INQUIRY-BASED LEARNING: INTERACTIONS BETWEEN BELIEFS, PRACTICES AND CLASSROOM CONTEXTS

Lyn Webb*
(Nelson Mandela Metropolitan University)
CHANGING MATHEMATICAL MINDSETS THROUGH NUMBER TALKS: A CASE STUDY WITH IN-SERVICE TEACHERS IN SOUTH AFRICA

Enriqueta Reston*
(University of San Carlos)
A NEEDS-BASED TEACHER DEVELOPMENT PROGRAM FOR INSERVICE TEACHERS: TOWARDS IMPLEMENTING A SPIRAL MATHEMATICS CURRICULUM

Deependra Budhathoki*, Binod Prasad Pant, Pundary Phuyal
(Kathmandu University)
APPRECIATIVE PEDAGOGY IN NEPALESE MATHEMATICS CLASSROOM

Location: D: yellow, West Wing Building, room 223

Group B – Session Chair: Yudong Yang
Presentations: Rebekah Elliott*, Wendy Rose Aaron
(Oregon State University)
IMPROVING PRACTICE USING A MODEL OF TEACHER PROFESSIONAL DEVELOPMENT

Nanette Marie Seago* (1), Karen Koellner (2), Jennifer Jacobs (3)
(1: WestEd; 2: Hunter College; 3: University of Colorado)
PREPARING TO FACILITATE MATHEMATICS PROFESSIONAL DEVELOPMENT: AIMING FOR ALIGNMENT BETWEEN THE PROGRAM AND THE FACILITAT

Stephen Lee*, Bernard Murphy, Charlie Stripp
(Mathematics in Education and Industry)
PROFESSIONAL DEVELOPMENT OF MATHEMATICS TEACHERS: ADDRESSING THE CHALLENGES OF SUSTAINABILITY AND SCALABILITY

Edith Schneider*
(University of Klagenfurt)
“PEDAGOGY AND SUBJECT DIDACTICS – MATHEMATICS” – A TWO YEAR PROFESSIONAL PROGRAMME FOR TEACHERS
Mette Andresen*  
(University of Bergen)  
A RESEARCH PROJECT EVALUATED AS A MEANS FOR TEACHERS’ PROFESSIONAL DEVELOPMENT

Suanrong Chen* (1), Sherry Herron (2), Jiu Ding (2), Richard Mohn (2)  
(1: Yangzhou University; 2: The University of Southern Mississippi)  
ASSESSING AWARENESS OF FRACTAL GEOMETRY AMONG SECONDARY MATHEMATICS TEACHERS IN THE UNITED STATES AND CHINA

Third Session: Friday, 29 July 2016, 15.00 – 16.00  
Location: D: yellow, West Wing Building, room 220

Group A – Session Chair: Konrad Krainer  
Presentations: Fu Ma*, Xiaomei Liu, Fei Zhang, Shoufu Jiang, Xiaocheng Li  
(Beijing Normal University)  
THE INFLUENCE ON TEACHER BELIEF OF NETWORKED STUDY AIMING AT TEACHERS’ PROFESSIONAL DEVELOPMENT

Larissa Zwetzschler* (1), Kim Alexandra Rösike (2), Susanne Prediger (2), Bärbel Barzel (1)  
(1: University Duisburg-Essen; 2: TU Dortmund University)  
PROFESSIONAL DEVELOPMENT LEADERS’ PRIORITIES OF CONTENT AND THEIR VIEWS ON PARTICIPANT-ORIENTATION

Nielce Meneguelo Lobo da Costa*, Maria Elisabette Brisola Brito Prado  
(Universidade Anhanguera de São Paulo)  
MATHEMATICS TEACHER EDUCATION AND INVESTIGATIVE TASKS: DEVELOPING THE TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE

Ji-Won Son*  
(University at Buffalo – The State University of New York)  
ASSOCIATION BETWEEN TEACHER FEEDBACK AND MATH INSTRUCTION IN JAPAN, KOREA, SINGAPORE, AND THE UNITED STATES

Location: D: yellow, West Wing Building, room 222

Group B – Session Chair: Hilda Borko  
Presentations: Claudia Lisete Oliveira Groenwald, Carmen Teresa Kaiber, Jutta Cornelia Reuwsaat Justo, Marlise Geller*  
(Universidade Luterana do Brasil)  
SCIENCE AND MATHEMATICS IN-SERVICE TEACHER EDUCATION AIMING THE DEVELOPMENT FOR CITIZENSHP BEHAVIOR: RESEARCHES FROM OB

Gabriel Rubén Soto*  
(Universidad Nacional de la Patagonia San Juan Bosco)  
NETWORK THEORY AND PROFESSIONAL DEVELOPMENT: A CASE STUDY

Zhongru Li*  
(Southwest University)  
LEARNING PATHS OF TRIGONOMETRIC FUNCTION BASED ON Q-MATRIX AND CLUSTERING FROM THE PERSPECTIVE OF REMEDIAL TEACHING
Fourth Session: Friday, 29 July 2016, 16.30–18.00
Location: D: yellow, West Wing Building, room 122

Group A – Session Chair: Sitti Patahuddin
Presentations: Maha Abboud-Blanchard*
(University of Cergy-Pontoise)
MATHEMATICS TEACHER EDUCATORS AND TECHNOLOGY: DEVELOPING AN APPROPRIATE TRAINING COURSE

Wajeeh Daher (1,2), Nimer Bayaa* (1), Rawan Anabousy (1)
(1: Alqasimi Academic College of Education; 2: An-Najah National University)
PROFESSIONAL DEVELOPMENT SCHOOL AS A CATALYST FOR IN-SERVICE TEACHERS’ INTEGRATION OF ICT

Michael Besser*, Dominik Leiss
(Leuphana University of Lueneburg)
THE EFFECT OF PROFESSIONAL DEVELOPMENT ON TEACHERS’ PCK, ON BELIEFS AND ON THE QUALITY OF TEACHING

Russell West Jr, David Wees*, Jesse Johnson
(New Visions for Public Schools)
THREE CHALLENGES IN BUILDING A NETWORK SUPPORTING AMBITIOUS TEACHING OF SECONDARY MATHEMATICS

Shadrack Moalosi*
(Naledi Senior Secondary School)
WHAT GETS ENACTED IN OBJECT FOCUSED PROFESSIONAL DEVELOPMENT?

Xiaoqing Shang*, Xiaoduan Chen
(Shaanxi Normal University)
INVESTIGATION THE CONSITENCY BETWEEN TEACHERS’ META-TEACHING BEHAVIOR AND ITS CONSCIOUSNESS IN CHINA

Location: D: yellow, West Wing Building, room 223

Group B – Session Chair: Konrad Krainer
Presentations: Andriceli Richt* (1), Rosana Giaretta Sguerra Miskulin (2)
(1: Instituto Federal Catarinense – IFC – Campus Concórdia;
2: Universidade Estadual Paulista – UNESP – Campus Rio Claro)
ONLINE COMMUNITY OF PRACTICE AND TPACK: A STRATEGY FOR THE FORMATION OF HIGHER EDUCATION MATH TEACHER

Thomas Hahn*, Andreas Eichler
(University Kassel)
TEACHERS’ MOTIVATION TO THINK STUDENT-CENTRED IN THE CONTEXT OF PROFESSIONAL DEVELOPMENT

Benita P. Nel*
(University of the Witwatersrand)
THE USE OF A COMMUNITY OF PRACTICE AS A TOOL TO BREAK THE ISOLATEDNESS OF SPECIALIST TEACHERS IN RURAL SETTINGS
Ingrid Elizabeth Mostert* (1), Marie Joubert (2)
(1: African Institute for Mathematical Sciences Schools Enrichment Center; 2: African Institute for Mathematical Sciences Schools Enrichment Center)
DESIGNING AND DEVELOPING MATHEMATICS LESSON PLANS IN A DESIGN RESEARCH PROJECT: WHAT TEACHERS LEARNT

Freyja Hreinsdóttir*
(University of Iceland)
NORDIC GEOGEBRA NETWORK – A NETWORK FOR LEARNING, EXPERIMENTING AND RESEARCH FOR MATHEMATICS TEACHERS AND RESEARCHERS

Zengcheng Yue*
(East China Normal University)
ANALYSIS OF JUNIOR MIDDLE SCHOOL MATHEMATICS TEACHERS’ PAPERS IN MAINLAND CHINA

TSG 51 – Diversity of theories in mathematics education
Co-chairs: Tommy Dreyfus (Israel), Anna Sierpinska (Canada)
Team members: Stefan Halverscheid (Germany), Steve Lerman (UK), Takeshi Miyakawa (Japan)

Second Session: Tuesday, 26 July 2016, 16.30–18.00
Location: C: turquoise, Main Building, room 118

Session Chair: Tommy Dreyfus, Steve Lerman
Presentations: Celina Abar* (PUC/SP)
MATHEMATICS EDUCATION AND TECHNOLOGICAL INNOVATION

Juan D. Godino* (1), Carmen Batanero (2), Vicenç Font (3), Ángel Contreras (4), Miguel R. Wilhelmi (5)
(1: Universidad de Granada; 2: Universidad de Granada; 3: Universidad de Barcelona; 4: Universidad de Jaén; 5: Universidad Pública de Navarra)
THE THEORY OF DIDACTICAL SUITABILITY: NETWORKING A SYSTEM OF DIDACTICS PRINCIPLES FOR MATHEMATICS EDUCATION FROM DIFFERE

Hatice Kubra Guler* (1), Cigdem Arslan (2)
(1: Uludag University; 2: Istanbul University)
CONSOLIDATING SIMILARITY KNOWLEDGE BY THE HELP OF PYTHAGOREAN THEOREM

Gilmer Jacinto Peres* (1), Rúbia Barcelos Amaral (2)
(1: Centro Federal de Educação Tecnológica de Minas Gerais – CEFET/MG; 2: Universidade Estadual Paulista – Rio Claro)
PERSPECTIVES FROM BRICOLAGE TO MATHEMATICS EDUCATION

Ridha Najar*
(Université du Québec en Abitibi-Témiscamingue)
ANTHROPOLOGICAL AND COGNITIVE APPROACHES IN MATHEMATICS EDUCATION – WHAT ARE THE RELATIONSHIPS?
Fourth Session: Friday, 29 July 2016, 16.30–18.00
Location: C: turquoise, Main Building, room 118

Session Chairs: Anna Sierpinska, Stefan Halverscheid
Presentations: José Vilani Farias* (1), Denise Silva Vilela (2)
(1: Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Norte;
2: Universidade Federal de São Carlos)
THE FIELD OF MATHEMATICS AND THE STRATEGIES OF DISTINCTION FOR TEACHER TRAINING

Barbara Busisiwe Goba*, Renuka Vithal
(University of KwaZulu-Natal)

Pedro Nicolás*
(University of Murcia)
EVOlUTIONARY EPISTEMOLOGY THEORY AND REFERENCE EPISTEMOLOGICAL MODELS

José David Zaldívar-Rojas*
(University Autónoma de Coahuila)
WHAT CAN WE LEARN FROM OUR STUDENTS? REFLECTIONS ON THE USE OF THE GRAPHS IN OUTREACH ACTIVITIES OF SCIENCE

TSG 52 – Empirical methods and methodologies

Co-chairs: David Clarke (Australia), Alan Schoenfeld (USA)
Team members: Bagele Chilisa (Botswana), Paul Cobb (USA), Christine Knipping (Germany)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: K: purple, Law Building, room 13

Session Chair: David Clarke
Presentations: Abigail Fregni Lins* (1), Patricia Sandalo Pereira (2), Mercedes Carvalho (3)
(1: State University of Paraíba UEPB; 2: Federal University of Mato Grosso do Sul UFMS;
3: Federal University of Alagoas UFAL)
COLLABORATIVE RESEARCH WORK PROJECT WITH TEACHERS WHO TEACH MATHEMATICS AT SCHOOL LEVEL IN THE NORTH EAST AND CENTER EAST

Claudia Regina Flores*
(Federal University of Santa Catarina)
TOWARDS A CRITICAL EDUCATIONAL RESEARCH IN EDUCATION, MATHEMATICS AND ART
TSG 53 – Philosophy of mathematics education

Co-chairs: Paul Ernest (UK), Ladislav Kvasz (Czech Republic)
Team members: Maria Bicudo (Brazil), Regina Möller (Germany), Ole Skovsmose (Denmark/Brazil)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: B: dark-brown, East Wing Building, room 120

Session Chair: Ole Skovsmose
Presentations: Jessica Kunsteller* (University of Cologne)
USING FAMILY RESEMBLANCES FOR ELABORATING MATHEMATICAL RULES

Colin Jackson* (1), Hilary Povey (1), Gill Adams (1), Emanuela Ughi (2)
(1: Sheffield Hallam University; 2: University of Perugia)
THE ROLE OF EXHIBITIONS BY CHILDREN IN MAKING MATHEMATICS

Durga Prasad Dhakal* (Kathmandu University)
PHILOSOPHY OF MATHEMATICS AND ITS RELEVANCE IN MATHS CLASSROOM

Third Session: Friday, 29 July 2016, 15.00–16.00
Location: B: dark-brown, East Wing Building, room 120

Session Chair: Paul Ernest
Presentations: Bronislaw Czarnocha* (City University of New York)
OCKHAM RAZOR OF THE CREATIVITY RESEARCH IN MATHEMATICS EDUCATION

Karla Viviana Sepúlveda Obreque* (1,2), Javier Lezama Andalon (2)
(1: Universidad Católica de Temuco; 2: Instituto Politécnico Nacional de México)
EPISTEMOLOGY OF TEACHERS ABOUT THE MATHEMATICAL KNOWLEDGE: A SOCIO EPISTEMOLOGICAL STUDY

Allan Tarp* (MATHeCADEMY.net)
FROM ESSENCE TO EXISTENCE IN MATHEMATICS EDUCATION
TSG 54 – Semiotics in mathematics education

Co-chairs: Norma Presmeg (USA), Luis Radford (Canada)
Team members: Gert Kadunz (Austria), Luis Puig (Spain), Wolff-Michael Roth (Canada)

First Session: Tuesday, 26 July 2016, 15.00–16.00
Location: K: purple, Law Building, room 1+2

Session Chair: Norma Presmeg
Presentations: Jesus Victoria Flores Salazar *, Katia Vigo Ingar (1), Katia Vigo Ingar (2)
(1: Pontificia Universidad Catolica del Peru; 2: Pontificia Universidad Catolica del Peru)
FIGURAL AND GRAPHIC REPRESENTATION IN DGE AND CAS

José Luis López Hernández *, José Guzmán Hernández
(Center of Research and Advanced Studies)
ARTIFACTS AND GESTURES IN THE PROCESS OF OBJECTIFICATION OF THE CONCEPT OF VARIATION

Uta Priss *
(Ostfalia University)
A SEMIOTIC-CONCEPTUAL ANALYSIS OF CONCEPTUAL DEVELOPMENT IN LEARNING MATHEMATICS

Daniela Behrens *
(Universität Bremen)
BUNDLING AND DE-BUNDLING BY DRAGGING: FROM ACTING TO GESTURING

Third Session: Friday, 29 July 2016, 15.00–16.00
Location: K: purple, Law Building, room 1+2

Session Chair: Luis Radford
Presentations: Gloria Inés Neira Sanabria *
(University distrital francisco jose de caldas)
REPRESENTACIONES, LENGUAJE, SÍMBOLOS, SEMIÓTICA, NARRATIVAS SIMBÓLICAS VS. COMPRENSIÓN EN MATEMÁTICAS

Nicole Engelke Infante *
(West Virginia University)
HIGHLIGHTING KEY LINKS THROUGH GESTURE: A CASE STUDY OF THE SECOND DERIVATIVE TEST

Anna Shvarts *, Anatoly Krichevets
(Lomonosov Moscow State University)
DUAL EYE-TRACKING AS A METHOD TO INVESTIGATE THE ACQUIRING OF THEORETICAL PERCEPTION OF VISUAL REPRESENTATIONS
Poster

**Time:** Tuesday, 26 July 2016, 18.00–19:00 / **Location:** E: mint, Economical Building, foyer

**TSG 1 – Early childhood mathematics education (up to age 7)**

Simone Dunekacke* (1), Katja Eilerts (2), Lars Jenßen (3)
1: IPN Kiel; 2: Humboldt-Universität zu Berlin; 3: Freie Universität Berlin
RELATIONS OF AFFECTIVE, COGNITIVE AND SITUATIONSSPECIFIC FACETS OF PRESCHOOL TEACHERS PROFESSIONAL COMPETENCE

Nosisi Feza* (1), Noludwe Bambiso (2)
1: University of South Africa; 2: Forthare University
SOUTH AFRICA’S EDUCATORS’ MATHEMATICS TEACHING JOURNEY: A CASE OF 5–6 YEAR OLD EDUCATOR PRACTISES

Lina Fonseca*
Instituto Politécnico de Viana do Castelo
MATHEMATICS IN EARLY YEARS: SOLVING PROCESS PROBLEMS IN KINDERGARTEN

Ryan Nivens, Rosemary Geiken*
East Tennessee State University
USING A COMPUTER SCIENCE-BASED BOARD GAME TO DEVELOP PRESCHOOLERS’ MATHEMATICS

Manabu Goto*
Sagami Women’s university
REFORM OF THE KINDERGARTEN TEACHERS AND CHILD CARE WORKERS IN DAY-CARE CENTER TRAINING CURRICULUM IN JAPAN

Esther Henschen*
University of Education (Pädagogische Hochschule)
MATHEMATICAL CONTENT OF PLAY ACTIVITIES IN KINDERGARTEN, EXAMPLIFIED ON BLOCKPLAY ACTIVITIES

Kam Ling Lao*
Open University of Hong Kong
COMPARISON OF THREE EARLY CHILDHOOD CURRICULA FROM THE PERSPECTIVE OF MATHEMATICS EDUCATION

Ana Belén Sánchez García, Mª Consuelo Monterrubio Pérez*, Elena Ramírez Orellana, Jorge Martín Domínguez
University of Salamanca
CATEGORY ANALYSIS SYSTEM FOR THE EDUCATIONAL PRACTICE WITH ICTS RESOURCES IN EARLY CHILDHOOD EDUCATION

Anne Nakken* (1), Yvonne Grimeland (2), Beate Nergård (2), Oliver Thiel (2)
1: Norwegian Centre for Mathematics Education; 2: Queen Maud University College
YOUNG CHILDREN’S PLAY IN A MATHEMATICS ROOM

Dee Jean Ong*
REAL Education Group Sdn Bhd
SIMPLE AUGMENTED REALITY (AR) FOR EARLY CHILDHOOD MATHEMATICS
DEVELOPMENT OF CHILDREN’S ABILITY TO RECOGNIZE GEOMETRIC SHAPES THROUGH PATTERNS

Katja Elierts, Lars Jenßen, Michael Eid, Corinna Schmude, Thomas Koinzer, Sigrid Blömeke, Julia Rasche*
Humboldt-Universität zu Berlin
PRO-KOMMA: EFFECTIVENESS OF PRESCHOOL TEACHER EDUCATION IN THE FIELD OF MATHEMATICS

Simeon Schlicht*
University of Cologne
ABOUT THE DEVELOPMENT OF CONCEPTS OF SETS AND NUMBERS – A QUALITATIVE CASE STUDY WITH 3- TO 4-YEAR-OLDS

Seanyelle Yagi*
University of Hawaii
AN EXPLORATION OF FIRST GRADE STUDENTS’ ENGAGEMENT IN MATHEMATICAL PROCESSES DURING WHOLE GROUP DISCUSSIONS

Jennifer Young-Loveridge*, Brenda Bicknell
University of Waikato
TENS AWARENESS: A FRAMEWORK FOR EARLY PLACE VALUE LEARNING

Time: Tuesday, 26 July 2016, 18.00–19:00 / Location: E: mint, Economical Building, foyer
TSG 2 – Mathematics education at tertiary level

Mike Altieri* (University of Dortmund)
PROCEDURAL KNOWLEDGE AS A PREDICTOR FOR SUCCESS IN GERMAN MATH EXAMS FOR FIRST YEAR ENGINEERING STUDENTS

Mary Beisiegel* (Oregon State University)
MATHEMATICS GRADUATE TEACHING ASSISTANTS’ LONGITUDINAL TRANSITIONS IN BELIEFS ABOUT MATHEMATICS TEACHING AND LEARNING

Luis Weng San, Bhangy Cassy* (University Eduardo Mondlane – UEM)
ALGEBRAIC THINKING IN THE UNDERSTANDING AND SOLUTION OF GEOMETRIC PROBLEMS AMONG 1ST YEAR UNIVERSITY STUDENTS

Chris Rasmussen (1), Jess Ellis* (2)
1: San Diego State University; 2: Colorado State University
RESULTS OF US NATIONAL STUDY ON CALCULUS

Yael Fleischmann*, Alexander Börsch, Rolf Biehler, Christoph Colberg, Tobias Mai
University of Paderborn
STUDIFINDER: MATHEMATICAL E-LEARNING MATERIALS FOR THE TRANSITION FROM SECONDARY SCHOOL TO UNIVERSITY

Alfonso J. González-Regaña*, Verónica Martin-Molina, José María Gavilán-Izquierdo
Universidad de Sevilla
CONCEPT AND APPLICATION OF MATHEMATIZING TO THE PROCESS OF CLASSIFICATION
Roland **Gunesch**
PH Vorarlberg

**HOW, WHEN, WHERE AND WHY DO STUDENTS USE LECTURE RECORDINGS?**

Mathias **Hattermann** (1), Alexander **Salle** (2), Stefanie **Schumacher** (2), Daniel **Heinrich** (1)
1: Paderborn University; 2: Osnabrück University

**DIGITAL MEDIA AS MOTIVATING TOOL FOR LEARNING DESCRIPTIVE STATISTICS**

Marios **Ioannou**
University of the West of England – Alexander College

**A COMMOGNITIVE PERSPECTIVE ON STUDENTS’ ENGAGEMENT WITH THE CONCEPT OF GROUP: THE CASE OF STUDENTS F AND M**

Seong-A **Kim** (1), Jeong-Gyoo **Kim** (2), Sunhee **Lee** (3)
1: Dongguk University; 2: Seoul National University of Science and Technology; 3: Ewha Womans University

**STUDENTS’ PERCEPTION OF GROUP DISCUSSIONS AND PRESENTATIONS IN A MATH EDUCATION COURSE**

Heather **Lonsdale** (1), Deborah **King** (2)
1: Curtin University; 2: The University of Melbourne

**PERCEPTION VS REALITY: USING TUTORIAL VIDEOS TO AID TUTOR REFLECTION**

Carolyn **Masserang**
The University of Michigan

**A COMPARATIVE ANALYSIS OF THREE COMPREHENSIVE INITIATIVES TO REDESIGN DEVELOPMENTAL MATHEMATICS COLLEGE CURRICULUM**

Anthony **Morphett**
University of Melbourne

**SUPPORTING INTERNALISATION OF MATHEMATICAL SYNTAX USING BLOCKS**

Philip **Walker** (1), Eabhnat Ni **Fhloinn** (2)
1: University of Leeds; 2: Dublin City University

**REVISION ACTIVITIES OF UNDERGRADUATE MATHEMATICS STUDENTS**

Pierre-Vincent **Quéré** (1,2), Ghislaine **Gueudet** (2,3)
1: UBO; 2: CREAD; 3: ESPE Bretagne

**AUTONOMY IN MATHEMATICS IN THE SECONDARY-TERTIARY TRANSITION**

Kristina **Raen**
University of Agder

**MATHEMATICAL COMPETENCIES VISIBLE THROUGH ASSESSMENT FOR ENGINEERING STUDENTS**

Johanna **Rämö**, Juulia **Lahdenperä**, Susanna **Oksanen**
University of Helsinki

**UNIVERSITY TEACHING ASSISTANTS’ TEACHING RELATED BELIEFS**

Ingolf **Schäfer**
University of Bremen

**BREMATH – REDESIGN AND IMPLEMENTATION OF UNIVERSITY MATHS COURSES FOR FUTURE HIGH SCHOOL TEACHERS**
SUMMARY AND STRUCTURE OF THIS PRESENTATION

**Karsten Schmidt**
Technical University of Denmark

ASSIGNMENTS AND WRITTEN EXAMS IN AN ICT LEARNING ENVIRONMENT

**Thomas Stenzel**
University of Duisburg-Essen

EXPlicATING STRATEGIES – PLANNING AN INTERVENTION TO INCREASE THE STRATEGIC KNOWLEDGE OF UNIVERSITY FRESHMEN

**Gero Stoffels**
University of Siegen

DESCRIPTION AND INITIAL RESULTS OF THE PRESERVICE TEACHERS SEMINAR “ÜBERPRO-WAHRSCHENLICHKEITSRECHNUNG”

**Sophie Stuhlmann**
University of Hamburg

ARTIN’S BRAID GROUP AS AN INTRODUCTORY EXAMPLE FOR GROUP THEORY APPROACHES AT THE UNIVERSITY OF HAMBURG

**Athina Thoma**
University of East Anglia

LECTURERS’ PEDAGOGICAL ROUTINES AND EXPECTATIONS ON STUDENTS’ ENGAGEMENT IN CLOSED-BOOK EXAMINATIONS

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**Time:** Tuesday, 26 July 2016, 18.00–19:00 / **Location:** E: mint, Economical Building, foyer

**TSG 4 – Activities for, and research on, mathematically gifted students**

**Rafael Ramirez** (1), M Jose Beltran (2), Adela Jaime (2), Angel Gutierrez* (2)
1: University of Granada; 2: University of Valencia

COOPERATIVE LEARNING OF GIFTED STUDENTS IN A VIDEO CALL MATHEMATICS ENVIRONMENT

**Ulla Inkeri Hedewig**
Universität Hamburg

ABOUT THE DEVELOPMENT OF METACOGNITIVE COMPETENCIES OF MATHEMATICALLY GIFTED PRIMARY GRADE STUDENTS

**Kioko Kakihana**
TSUKUBA GAKUIN UNIVERSITY

A CHANCE TO FIND AND CULTIVATE PROMISED STUDENTS

**Bulent Kaygin** (1), Ayfer Budak (2), Ibrahim Budak (1)
1: Erzincan University; 2: Dumlupınar University

EXAMINING SELF-REGULATED LEARNING (SRL) SKILLS OF MATHEMATICALLY GIFTED STUDENTS DURING PROJECT DEVELOPMENT

**Yuwen Li** (1), LianBang Li (2), Bing Wang (3), Min Du (3), Pinhua Yin (2), Shengjie Fan (4)
1: Mathematics Education Research Institute; 2: Dezhou Department of Education; 3: Dezhou Changhe Elementary School; 4: Dezhou Tianqu Central Elementary School

EXPERIMENTAL STUDY ON INTELLECTUAL DEVELOPMENT IN ELEMENTARY SCHOOL STUDENT
Dimakatso Agnes Mohokare*
Central University of Technology
TEACHING MATHEMATICALLY GIFTED LEARNERS IN REGULAR CLASSROOMS IN SOUTH AFRICA

Steffen Overgaard*, Pia Tonnesen, Peter Weng
Metropolitan University College
TEACHERS’ CHARACTERIZATION OF HIGH ACHIEVING STUDENTS IN MATHEMATICS

Inge Schwank*
University of Cologne
ON THE BENEFITS OF FUNCTIONAL-LOGICAL THINKING IN MATHEMATICALLY GIFTED PRIMARY SCHOOL CHILDREN

Moritz Zehnder*
Universität Bayreuth
MATHEMATICAL GIFTEDNESS AND ITS IDENTIFICATION IN SECONDARY SCHOOL

Time: Tuesday, 26 July 2016, 18.00–19:00 / Location: E: mint, Economical Building, foyer
TSG 5 – Activities for, and research on, students with special needs

Anna-Sophia Bock*
University of Hamburg
PREPARING PROSPECTIVE MATHEMATICS TEACHERS FOR INCLUSIVE CLASSES

Heidie Clemens* (1), Lena Lindenskov (2)
1: VIA University College; 2: Aarhus University
TEACHERS’ BELIEFS ABOUT LEARNING DIFFICULTIES

M. Consuelo Monterrubio, Laura Delgado*, M. Carmen López
University of Salamanca
TRAINING FUTURE MATHEMATICS SECONDARY TEACHERS: WORKING IN A CLASSROOM WITH SPECIAL EDUCATIONAL NEEDS STUDENTS

Hokyoung Ko (1), Hwanchul Lee (2), EunJeng Lee (2), Jihye Ee* (3)
1: Ajou university; 2: Korea Foundation for the Advancement of Science & Creativity; 3: Graduation of Ajou University
A RESEARCH ON THE ACTUAL CONDITION AND IMPROVEMENT OF MATHEMATICS LEARNING FOR KOREAN STUDENTS

Akira Morimoto*
Fukushima University
PROMOTING MATHEMATICAL DISCOURSE IN CLASSROOMS FOR THE DEAF

Anna Noll*, Jürgen Roth, Markus Scholz
University Koblenz-Landau
HOW TO DESIGN EDUCATIONAL MATERIAL FOR INCLUSIVE CLASSES

Andrea Peter-Koop*, Rottmann Thomas
Bielefeld University
CHILDREN WITH SPECIAL NEEDS UN LEARNING MATHEMATICS: INTRODUCING A REVISED CONCEPTUAL MODEL FOR INTERVENTION
DESIGNING ACTIVITIES FOR POPULARIZATION OF MATHEMATICS IN IRAN
Mohammad Bahrami* (1), Masture Heydari (2)
1: Shahid Beheshti University of Iran; 2: Shahid Rajaee Teacher Training University

MATHEMATICAL SELFIES — VISUALIZING MATHEMATICS WITH PHOTOGRAPHS
Emmanuelle Forgeoux* (1,3,4), Axelle Faughn (2)
1: Lycee Victor et Helene Basch; 2: Western California University; 3: IREM de Rennes; 4: Commission nationale Inter-IREM Lycée

A NINE-YEAR EXPERIENCE OF PROMOTION OF MATHEMATICS
Juan J. Moreno-Balcázar*, Isabel Ortiz, Fernando Reche
University of Almería

IN THE FOOTSTEPS OF M. C. ESCHER
Veronica Philemon Sarungi*
Aga Khan University

PRE-PI DAY: PROMOTING MATHEMATICS FOR ALL
Aviva Szpirglas*
Université de Poitiers

UNITED STATES OF AMERICA MATH CIRCLES, VERTICALLY-INTEGRATED INFORMAL MATHEMATICAL COMMUNITIES
Yan-Hong Chen*
Bureau of Education

A COMPARISON OF TWO ELEMENTARY SCHOOL TEACHER MATH PEDAGOGICAL CONTENT KNOWLEDGE
Rakotondrajao Fanja*
University of Antananarivo

How Malagasy People Did Arithmetic?
Doris Jeannotte* (1), Claudia Corriveau (2)
1: UQAM; 2: Université Laval
REASONING AND INTERVENTION IN ARITHMETIC ACTIVITIES: FOCUS ON MANIPULATIVES

Sabrina Lübke*
TU Dortmund University
COMPUTATIONAL ESTIMATION – INFORMAL STRATEGIES

Sergio Martínez-Juste* (1), Jose M. Muñoz-Escolano (1), Antonio M. Oller-Marcén (2)
1: Universidad de Zaragoza; 2: Centro Universitario de la Defensa de Zaragoza
PROPORTIONAL DISTRIBUTION PROBLEMS: STRATEGIES OF THE STUDENTS BEFORE RECEIVING FORMAL INSTRUCTION

Maria de Fatima Mendes* (1), Catarina Raquel Delgado (1), Joana Maria Brocardo (1), Jean-Marie Kraemer (2)
1: Escola Superior de Educação do Instituto Politécnico de Setúbal; 2: CITO
FLEXIBILITY IN MENTAL CALCULATION

Jatuporn Nasinsroy*, Narumon Changsri, Maitree Inprasitha
Khon Kaen University
STUDENTS’ MATHEMATICAL THINKING ON MULTIPLICATION IN CLASSROOM USING LESSON STUDY AND OPEN APPROACH

Sandra Magina, Eurivalda Ribeiro dos Santos Santana*, Irene Cazorla
Universidade Estadual de Santa Cruz
SIMPLE PROPORTION ONE TO MANY AND MANY TO MANY: WHY SO DIFFERENT BEHAVIOUR AMONG 5TH GRADE STUDENTS?

Aya Steiner*
Haifa University
DEVELOPMENT OF THE DISCOURSE OF RATIONAL NUMBERS

Pernille Bødtker Sunde*
Aarhus University
DEVELOPMENTAL PATHWAYS OF STRATEGIES IN ADDITION

Universidad de Antioquia
RELATIONSHIPS BETWEEN SPATIAL AND ARITHMETICAL ABILITIES: A CASE STUDY WITH THIRD GRADERS

Jialu Wang*
East China Normal University
HOW TO CONSTRUCT A LEARNING SPACE BASED ON THE CONCEPT OF FRACTIONS

Wenbin Xu*
Nanjing Normal University
IF THE ANSWER IS NOT UNIQUE, THEN WHICH SOLUTION IS CORRECT?
TSG 10 – Teaching and learning of early algebra

Sunti Bunlang* (1), Mairree Inprasitha (2), Sampan Thinwiangthong (3)
1: Ph.D student; 2: Center for Research in Mathematics Education; 3: Faculty of Education
ACTIVITY THEORY FOR MEDIATION IN CLASSROOM USING LESSON STUDY AND OPEN APPROACH

Ali Riza Kupcu (1), Hatice Nur Erbay* (2)
1: Marmara University; 2: Istanbul University
PATTERNS TO ALGEBRAIC THINKING

Shajahan Haja-Becker*
University of Trier
MIDDLE SCHOOL GIRLS’ RESPONSES TO SQUARE ROOT TASKS

Tadayuki Kishimoto*
University of Toyama
CLASSIFICATION OF MISCONCEPTIONS OF OPERATIONS WITH NEGATIVE ON NUMBER LINE

Rhett Anthony Cabahug Latonio* (1), Catherine Vistro Yu (2)
1: Sotero B. Cabahug FORUM for Literacy; 2: Ateneo de Manila University
ALIGNMENT OF INSTRUCTION METHODS USED IN TEACHING SIMILAR ARITHMETIC AND ALGEBRA CONCEPTS

Yujin Lee*
Korea National University of Education
AN ANALYSIS OF YOUNG STUDENTS’ FUNCTIONAL THINKING ACCORDING TO THE ORDER OF TASK TYPES

Antonio Moreno, María C. Cañas, Aurora del Río, Marta Molina*, María de la Sierra Morillo
Universidad de Granada
THIRD GRADERS’ STRATEGIES WHEN SOLVING A FUNCTIONAL THINKING PROBLEM

Eunseo Yoo*
Korea National University of Education
STUDENTS’ USE OF VARIABLES AS A MEANS TO REPRESENT THEIR FUNCTIONAL THINKING IN EARLY GRADES

TSG 11 – Teaching and learning of algebra

Ayça Akın*, Tangül Kabael
Anadolu University
THE LINK BETWEEN PRE-SERVICE MATHEMATICS TEACHERS’ QUANTITATIVE REASONING AND THEIR SUPPORT FOR QUANTITATIVE REASONING
Marlene Dias* (1), Valdir dos Santos Junior (2), Miriam Guadagnini (1)
1: Universidade Anhanguera de São Paulo; 2: Universidade Federal de Pernambuco
THE TRANSITION FROM SECONDARY TO HIGHER EDUCATION: THE CASE OF AFFINE FUNCTION IN BRAZIL

Christian Düsi* (1), Guido Pinkernell (2)
1: Cooperative State University Mosbach; 2: University of Education Heidelberg
ASPECTS OF PROFICIENCY IN SCHOOL ALGEBRA

Satoshi Enomoto*
University of Tsukuba
AN COMPARISON OF LEARNING TRAJECTORY IN TEXTBOOKS: FOCUSED ON A JAPANESE JUNIOR HIGH SCHOOL TEXTBOOK AND CIA

Viana Garcia*, Angel Jimenez, Flor Monserrat Rodriguez
Universidad Autonoma de Guerrero
SYNTHETIC DIVISION LINKING TO THE DIVISION ALGORITHM OF POLYNOMIALS

Rita Hofmann*, Jürgen Roth
Universität Landau
DIAGNOSING STUDENTS’ MISTAKES WHILE WORKING WITH GRAPHS OF FUNCTIONS

Kazuhiro Kurihara*
University of Tsukuba
AN ANALYSIS OF TEACHING MATERIALS OF THE ALGEBRAIC STRUCTURE IN THE MODERNIZATION OF MATHEMATICS EDUCATION

José Hugo Lara Solís* (1), María Araceli Juarez Ramírez (2), Lidia Aurora Hernández Rebollar (3)
1: International School; 2: Benemérita Universidad Autónoma de Puebla; 3: Benemérita Universidad Autónoma de Puebla
METACOGNITIVE STRATEGIES AND PERFORMANCE IN ALGEBRA WORD PROBLEMS.

Aoife O’Brien*, Máire Ní Riordáin
National University of Ireland
EXAMINING DIFFICULTIES IN INITIAL ALGEBRA IN THE IRISH CONTEXT

Maria Lucia Panossian* (1), Manoel Oriosvaldo de Moura (2)
1: Universidade Tecnológica Federal do Paraná; 2: Universidade de São Paulo
THE HISTORICAL AND LOGICAL MOVEMENT OF ALGEBRAIC CONCEPTS AS A PRINCIPLE FOR THE CONSTITUTION OF ALGEBRA’S TEACHING OBIE

Preechakorn Phachana*
Phukhieo School
DIAGRAMS: A TOOL FOR CONNECT ABOUT ALGEBRAIC AND GEOMETRIC REPRESENTATIONS OF ARITHMETIC SERIES

Michaela Scheuring*, Jürgen Roth
University of Koblenz-Landau
REAL EXPERIMENTS OR COMPUTER-BASED SIMULATIONS – HOW TO FOSTER FUNCTIONAL THINKING?

Irma E. Stevens*, Kevin C. Moore
University of Georgia
UNDERGRADUATE STUDENTS’ GRAPHING HABITS
**Time: Tuesday, 26 July 2016, 18.00–19:00 / Location: E: mint, Economical Building, foyer**

**TSG 12 – Teaching and learning of geometry (primary level)**

Benedetto Di Paola*
Università degli Studi di Palermo

ENHANCING GEOMETRICAL KNOWLEDGE, METACOGNITIVE REASONING AND VISUAL SPATIAL SKILLS THROUGH A PLAYING CHESS LABORATORY

Asuman Duatepe-Paksu* (1), Marc Husband (2), Walter Whiteley (2)
1: Pamukkale University; 2: York University

PRESERVICE TEACHERS’ DRAWINGS OF SYMMETRY LINES OF SQUARE

Daniela Götz*, Hedwig Gasteiger
Universität Osnabrück

GEOKIG – GEOMETRICAL COMPETENCIES AT PRIMARY SCHOOL AGE

Masanori Obayashi*
Joint Graduate School in Science of School Education

A CONSIDERATION ABOUT THE LEVEL OF LOGICAL THINKING IN FIGURAL DOMAIN

Kerstin Sitter*
University of Koblenz-Landau

THE INFLUENCE OF OUT-OF-SCHOOL LEARNING LOCATIONS ON LASTING KNOWLEDGE AND SKILLS RELATED TO GEOMETRIC SOLIDS

Yuko Sugino*
Kogakkan University

CONCEPT FORMATION OF FIGURE BY LOGO PROGRAMMING – PSEUDO PRIMITIVES MAKING TURTLE TURN AT INTERIOR ANGLE

João Carlos Terroso*
Instituto de Educação

USING PENROSE TESSELLATIONS TO IDENTIFY ISOMETRIES

Consuela Luiza Voica* (1), Sorin Alexe (2), Cristian Voica (3)
1: Herastrau Middle School; 2: XColony Project; 3: Dept. of Mathematics

USING MANIPULATIVES IN LEARNING GEOMETRY

**Time: Tuesday, 26 July 2016, 18.00–19:00 / Location: E: mint, Economical Building, foyer**

**TSG 13 – Teaching and learning of geometry – secondary level**

Wen-Haw Chen*
Tunghai University

COOPERATIVE LEARNING AS A TOOL TO TEACH A PROFESSIONAL GENERAL COURSE IN UNIVERSITY GEOMETRY

Manassés da Silva Batista* (1), Raimundo Nonato Ferreira Tito Filho (2), Antonio Kennedy Lopes Dantas (1), Francismar Holanda (1)
1: Federal Institute of Piauí; 2: State University Piauí

POTENTIALLY SIGNIFICANT TEACHING UNITS INVOLVING 3D GEOMETRY AND THALES’ THEOREM
João Alves da Silva*, Manassés da Silva Batista, Antonio Kennedy Lopes Dantas, Francismar Holanda
Federal Institute of Piauí
BLACK AND LIGHT TANGRAM: LEARNING FROM FUN AND INTERACTIVE WAY

Ivko Dimitric*
Penn State University Fayette
THE CONCEPT OF CENTER OF MASS IN TEACHING OF GEOMETRY

Samvel Haroutunian*
Armenian State Pedagogical University
SCHOOL COURSE OF GEOMETRY: CONTENT SELECTION AND TEACHING MATERIAL DISTRIBUTION

Marj Horne* (1,2), Rebecca Seah (2)
1: ACU; 2: RMIT University
DEVELOPING A LEARNING AND ASSESSMENT FRAMEWORK FOR GEOMETRIC REASONING TO SUPPORT TEACHING AND LEARNING IN YEARS 5–9

Soocheol Kim*
Catholic University of Daegu
AN ANALYSIS OF ACTUAL CONDITIONS OF JUSTIFICATION TO KOREAN NEW MATHEMATICS TEXTBOOKS: FOCUS ON MIDDLE SCHOOL GEOMETRY

Sunghee Kim*
Korea National University of Education
TEACHING ANALYTIC GEOMETRY EMPHASIZING REPRESENTATIONS AND TRANSLATIONS

Chris Kooloos* (1), Rainer Kaenders (2), Gert Heckman (3), Helma Oolbekkink (1)
1: Radboud Docentenacademie; 2: HCM; 3: IMAPP
VARIATIO DELECTAT: VARIATION IN MATHEMATICS

Tomohiro Ogihara*, Tatsuya Mizogushi
Tottori University
EDUCATIONAL VALUE OF THE CENTROID OF TRIANGLE

Shinya Ohta*, Toshiji Matsubara
Japan
“VIEWPOINTS AND OBJECTS OF THE OBSERVATION” IN LEARNING SPACE FIGURES

Yuki Osawa*
Kaichi Mirai Junior and Senior High School
HEURISTIC AND INQUIRY BASED LEARNING USING THE SEIFERT GRAPH

Balvir Singh*, Arthur Powell
Rutgers University
DOING GEOMETRY WITH 21ST CENTURY TOOLS AND NEEDS
Time: Tuesday, 26 July 2016, 18.00–19:00 / Location: E: mint, Economical Building, foyer
TSG 14 – Teaching and learning of probability

Roos Blankespoor* (1,2), Marja van den Heuvel-Panhuizen (1), Michiel Veldhuis (1),
Jan Boom (3), Anika Dreher (2)
1: Freudenthal FSW; 2: IPN Kiel; 3: Dept. of Developmental Psychology
A PILOT STUDY ON TEACHING PROBABILITY IN PRIMARY SCHOOL

Melissa Denisse Castillo Medrano*
Ministry of Education
ACHIEVEMENTS AND DIFFICULTIES IN LEARNING PROBABILITY

Eva Morais* (1), Maria Nascimento (1), J. Alexandre Martins (2)
1: Universidade de Trás-os-Montes e Alto Douro; 2: Instituto Politécnico da Guarda
REPRESENTATIONS IN PROBABILITY PROBLEMS: SOME EXAMPLES

Barbara Drollinger-Vetter, Alex Buff, Kathleen Philipp*
Zurich University of Teacher Education
PEDAGOGICAL CONTENT KNOWLEDGE AND MOTIVATION – PROBABILITY AS A TOPIC IN PRIMARY TEACHER EDUCATION

Time: Tuesday, 26 July 2016, 18.00–19:00 / Location: I: blue, Philosophical Tower, foyer
TSG 15 – Teaching and learning of statistics

Rukiye Aslan*, Sibel Kazak
Pamukkale University
INVESTIGATING MIDDLE SCHOOL MATHEMATICS TEACHERS’ PEDAGOGICAL CONTENT KNOWLEDGE IN RELATION TO STATISTICAL REASONING

Ayse Aysin Bilgin*
Macquarie University
ASSESSMENT IN AN UNDERGRADUATE STATISTICS CAPSTONE UNIT

Karin Binder*, Stefan Krauss, Georg Bruckmaier, Jörg Marienhagen
University of Regensburg
VISUALIZATION OF COMPLEX BAYESIAN TASKS

Lonneke Boels* (1, 2), Arthur Bakker (1), Paul Drijvers (1), Wim van Dooren (3)
1: Utrecht University; 2: Christelijk Lyceum Delft; 3: KU Leuven
STUDENTS’ INTERPRETATIONS OF HISTOGRAMS: A REVIEW

Marsha Davis*, Hari Koirala, Sita Koirala
Eastern Connecticut State University
TEACHING STATISTICS THROUGH APPLETS

George Ekol*
Kyambogo University
TEACHER EDUCATION IN UGANDA: IMPLICATIONS FOR STATISTICS EDUCATION

Ida Kukliansky*
Ruppin Academic Center
INTERPRETATION OF CUMULATIVE FREQUENCY DISTRIBUTION GRAPHS: THREE LEVELS OF SENSE
Catherine Lynn Lane
University of Cincinnati Clermont College
LESSONS LEARNED FROM USING ‘MESSY DATA’ FOR A LEARNING PROJECT IN AN APPLIED STATISTICS COURSE

Hana Manor Braham*, Dani Ben-Zvi
Haifa University
DESIGNING FOR REASONING WITH UNCERTAINTY USING THE INTEGRATED MODELLING APPROACH

Achim Schiller*, Joachim Engel
PH Ludwigsburg University of Education
CIVIC STATISTICS AND THE PREPARATION OF FUTURE SECONDARY SCHOOL MATHEMATICS TEACHERS

Mathieu Séguin*, Sylvain Vermette
UQTR
SECONDARY SCHOOL MATHEMATICS TEACHERS PROFESSIONAL UNDERSTANDING OF THE ARITHMETIC AVERAGE CONCEPT.

Sietske Tacoma*, Paul Drijvers, Johan Jeuring
Utrecht University
ONLINE FEEDBACK IN HIGHER STATISTICS EDUCATION

Candy Walter*
Universität Hildesheim
AN EMPIRICAL STUDY ON PLANNING AND IMPLEMENTATION OF STATISTICAL DATA COLLECTIONS OF PUPILS OF THE 9TH AND 10TH GRADE

Time: Tuesday, 26 July 2016, 18.00–19:00 / Location: I: blue, Philosophical Tower, foyer
TSG 16 – Teaching and learning of calculus

Matias Arce*, Laura Conejo, Tomás Ortega
University of Valladolid
INDETERMINATE FORMS: TRACES OF A PROCEDURAL POINT OF VIEW IN STUDENTS

Qun Lin (1), Rongrong Cao* (2)
1: Academy of Mathematics and Systems Science; 2: School of Mathematics and Statistics CALCULUS BASED ON ARITHMETIC

Jun Chai (1), Louis Friedler* (2), Edward Wolff (2), Jun Li (3), Karen Rhea (4)
1: East China Normal University; 2: Arcadia University; 3: Deakin University; 4: University of Michigan A CHINA / US CALCULUS STUDY

Xuefen Gao*, Lina Zhang
ZSTU
A COMPARISON OF CALCULUS IN HIGH SCHOOL MATHEMATICS TEXTBOOKS BETWEEN CHINA AND UNITED STATES

Ma. de Lourdes Quezada-Batalla*, Rubén-Dario Santiago-Acosta, Ernesto Hernández-Cooper
ITESM-CEM
CALCULUS LABORATORY WITH FREE DESMOS SOFTWARE
Marit Hvalsøe Schou*
University of Southern Denmark
USING TANGIBLE MATERIALS AND TECHNOLOGY AS VISUALISATION IN UPPER SECONDARY CALCULUS TEACHING

Time: Tuesday, 26 July 2016, 18.00–19:00 / Location: I: blue, Philosophical Tower, foyer TSG 18 – Reasoning and proof in mathematics education

Cydara Cavedon Ripoll*
Universidade Federal do Rio Grande do Sul
MATHEMATICAL REASONING AND PROOF IN SCHOOL

Kimberly Conner* (1), Michelle Cirillo (2), Samuel Otten (1)
1: University of Missouri; 2: University of Delaware
LAUNCHING PROOF: A MULTI-LEVEL ANALYSIS OF SEVEN TEXTBOOKS

Emine Gaye Çontay* (1), Asuman Duatepe Paksu (2), Sibel Kazak (3)
1: Pamukkale University; 2: Pamukkale University; 3: Pamukkale University
THE PROOF SCHEMES OF PROSPECTIVE ELEMENTARY MATHEMATICS TEACHERS

Beata Lididimkeni Dongwi*, Marc Schafer
Rhodes University
EXAMINING MATHEMATICAL REASONING THROUGH ENACTED VISUALIZATION WHEN SOLVING WORD PROBLEMS

Aurora Fernández-León*, Rocío Toscano, José María Gavilán-Izquierdo
University of Seville
A MODEL TO CHARACTERIZE THE ACTIVITIES OF PROVING AND CONJECTURING OF PROFESIONAL MATHEMATICIANS

Soheila Gholamazad*
Research Institute for Education
PROOF AS A LITERATE MATHEMATICAL DISCOURSE

Abigail L. Higgins*, Shiv Smith Karunakaran
Washington State University
AN INQUIRY-BASED APPROACH TO TEACHING AN INTRODUCTION TO PROOF COURSE

Andrea Hofmann*, Sikunder Ali, Trond Stølen Gustavsen
University College of Southeast Norway
UNDERSTANDING AND DEVELOPING PRACTICES OF REASONING IN MATHEMATICS AMONG PRE-SERVICE AND IN-SERVICE MATHEMATICS TEACHERS

Julian Krumsdorf*
University of Cologne
VISUAL REASONING

Zekiye Ozgur*
University of Wisconsin-Madison
AN INVESTIGATION OF PROOF CONCEPTIONS IN A HIGH SCHOOL MATHEMATICS CLASSROOM

Poster
Miriam Krieger (1), Walther Paravicini* (1), Anja Panse (2)
1: Münster University; 2: Paderborn University
SELF-EXPLANATION TRAINING FOR ENHANCING PROOF COMPREHENSION AT UNIVERSITY – AN EMPIRICAL ANALYSIS

Petra Carina Tebartz*
Justus-Liebig-University of Gießen
PROVING IN MATHEMATICAL OLYMPIADS – A TASK ANALYSIS

Time: Tuesday, 26 July 2016, 18.00–19:00 / Location: I: blue, Philosophical Tower, foyer
TSG 19 – Problem solving in mathematics education

Yerkara Zholdibayuly Aidos*
Kazakh National Technical University after K.I.Satpayev
ADDRESSING ISSUES RELATED TO SOME CONCEPTS OF MATHEMATICS

Michèle Couderette* (1), Chantal Amade-Escot (1), Francia Leutenegger (2)
1: University Jean Jaurès Toulouse 2; 2: Université de Genève
WHAT PROBLEM-SOLVING PRINCIPLES ARE EXPLICITLY ADDRESSED FOR THE TEACHING OF SUBTRACTION IN SWISS AND FRENCH CURRICULA?

Pedro da Cruz Almeida* (1), António Domingos (2), Cecília Monteiro (1)
1: Escola Superior de Educação do Instituto Politécnico de Lisboa; 2: Faculdade de Ciências e Tecnologia – Universidade Nova de Lisboa
THE FORMULATION OF MULTIPLICATIVE CONTEXTS BY 3RD YEAR STUDENTS

Maria Madalena Dullius*, Geovana Luiza Kliemann
Univates
TEXTBOOKS AND MATHEMATICAL PROBLEM SOLVING

Cristina Esteley*, Mónica Villarreal
Facultad de Matemática Astronomía y Física-Universidad Nacional de Córdoba
PROBLEM POSEING AND MATHEMATICAL MODELING SCENARIOS: GAINING DISTINCTIVENESS AND SOUNDNESS

Maria Elisa Galvão*, Rosana Lima
Universidade Anhanguera de São Paulo
A METHODOLOGY FOR ORGANIZING PROBLEM SOLVING PROCESSES – AN ENTRY ATTACK

Hayato Hanazono*
University of Tsukuba
AESTHETIC JUDGMENTS IN HIGH SCHOOL STUDENTS’ MATHEMATICAL PROBLEM SOLVING

Magali Hersant* (1), Christine Choquet (1), Laetitia Bueno-Ravel (2)
1: Université Nantes; 2: ESPE de Bretagne
INQUIRY: RELATIONS BETWEEN RESEARCH QUESTIONS AND CURRICULUM REFORMS IN FRANCE

Pimpaka Intaros* (1), Maitree Inprasitha (2), Sampan Thinwiangthong (3)
1: Ph.D. student in Mathematics Education Program; 2: Assistant Professor; 3: Lecturer
STUDENTS’ NATURAL WAYS OF THINKING IN MATHEMATICS CLASSROOM TAUGHT BY OPEN APPROACH
Tsutomu Ishii*  
Bunkyo University  
REARCH ON THE TEACHING DEEPEN THE ARGUMENTATION IN PROBLEM SOLVING

Takashi Kato* (1), Seiji Moriya (2), Toshihiko Shindo (3)  
1: Tokyo University and Graduate School of Social Welfare; 2: Tamagawa University; 3: Yamanashi University  
EFFECTS OF STUDENTS REVIEWED “RELATIVE VALUES” USING DIAGRAMS

Chaeyeon Kim*, Jaehong Shin  
Korea National University of Education  
HOW DOES THE WAY OF ORGANIZING CONTINUOUS COVARIATIONAL SITUATIONS AFFECT PROBLEM SOLVING?

Qimeng Liu*, Xiaofeng Du, Jian Liu  
Beijing Normal University  
THE RELATIONSHIP BETWEEN SELF-EFFICACY AND MATHMETICS PROBLEM SOLVING WITHIN CHINESE GRADE 4 STUDENTS

Amal Mattoo*  
Sidwell Friends School  
INTRODUCING PROBLEM SOLVING STRATEGIES IN A RURAL MIDDLE SCHOOL IN KASHMIR

Anne Möller*  
University of Duisburg-Essen  
TEACHING VIA PROBLEM SOLVING VS. TEACHER-CENTERED ACCESS – A COMPARISON

Erica Marlúcia Leite Pagani* (1), Norma Suely Gomes Allevato (2)  
1: Centro Federal de Educação Tecnológica de Minas Gerais-CEFETMG; 2: Universidade Cruzeiro do Sul  
CONTRIBUTIONS OF METHODOLOGY OF TEACHING-LEARNING-ASSESSMENT THROUGH PROBLEM SOLVING WHEN WORKING WITH DERIVATIVES

Ruud Stolwijk* (1,2), Dédé de Haan (2), Michiel Doorman (2), Monica Wijers (2)  
1: Cito Arnhem; 2: Freudenthal Institute  
THE ALYMPIAD – A PRACTICAL PROBLEM SOLVING CHALLENGE

Kwame Yankson*, Jillian Mortimer, Edward Silver  
University of Michigan  
PISA PROBLEMS AS RESOURCES FOR MATHEMATICS PROBLEM-SOLVING INSTRUCTION

Time: Tuesday, 26 July 2016, 18.00–19:00 / Location: I: blue, Philosophical Tower, foyer  
TSG 20 – Visualisation in the teaching and learning of mathematics

Leonardo Barichello*  
University of Nottingham  
MATHEMATICAL REASONING WITH VISUAL REPRESENTATIONS IN SECONDARY SCHOOL

Rafael Ernesto Bourguet-Diaz*, Ruth Rodriguez  
Tecnologico de Monterrey  
FOCUSING ON CONCEPTS RATHER THAN IN TECHNIQUES INTO DIFFERENTIAL EQUATIONS
Ching Han Cheung*, Kai Yee Chiu
HKCCCU Logos Academy
DEVELOPING VISUAL PERCEPTION AND VISUAL IMAGERY FOR ELEMENTARY STUDENTS

Carolien Duijzer* (1), Marja van den Heuvel-Panhuizen (1,2), Michiel Veldhuis (1), Michiel Doorman (2)
1: Freudenthal FSW; 2: Freudenthal Institute FBW
A PILOT STUDY ON TEACHING GRAPHING OF CHANGE

Christine Gärtner*, Kathrin Cornetz, Esther Doumbouya-Hoffmann, Mareile Shaw, Jochen Laubrock
University of Potsdam
MATHEMATICAL STORY PROBLEMS IN TEXT FORM VERSUS IN COMIC FORM

Maria Teresa Escriva, Maria Jose Beltran-Meneu, Adela Jaime, Angel Gutierrez, Bernardo Gomez*
Universidad de Valencia
ABILITIES OF VISUALIZATION IN PRIMARY SCHOOL STUDENTS WITH DIFFERENT MATHEMATICAL TALENT

Josef Molnár*, Ludmila Kroulíková, Jana Slezáková
Palacký University Olomouc
TESTING OF GEOMETRICAL IMAGINATION NUMBER 2

Barbara Ott*
PH St. Gallen
ANALYSIS OF CHILDREN’S DRAWINGS TO WORD PROBLEMS

Angela Schmitz*
University of Education
COMPLEX ATTITUDES TOWARDS MATH VISUALIZATION IN THE CLASSROOM

Alla Stolyarevska* (1), Yuriy Kuznyetsov (2)
1: International Solomon University; 2: Research Production Enterprise Hartron-Arkos
THE VISUALIZATION OF SPACECRAFT ORBITAL MANEUVERS WITH USING GEOGEBRA PACKAGE

Time: Tuesday, 26 July 2016, 18.00–19:00 / Location: I: blue, Philosophical Tower, foyer
TSG 21 – Mathematical applications and modelling in the teaching and learning of mathematics

Marianela Cristina Asinari*, Shirley Luz Frassa
Universidad Nacional de Córdoba
MATHEMATICAL MODELING EXPERIENCE IN A RURAL SECUNDARY SCHOOL WITH MULTIGRADE MODE

Roque Batulan*
Abu Dhabi Men’s College
MODELING, COMPUTING AND TECHNOLOGY SIMULATION: AN APPROACH TO LEARNING APPLICATIONS OF NUMERICAL APPROXIMATIONS

Patrick Capraro*
University of Kaiserslautern
A MODELING PROJECT FOR THE ENTIRE SECONDARY SCHOOL CURRICULUM
Mary C. Enderson*, Ginger S. Watson  
Old Dominion University  
**PRE-SERVICE MATHEMATICS TEACHERS’ EXPERIENCES IN USING MODELING TASKS TO DEVELOP MATHEMATICAL QUESTIONING**

Régis Forner*  
UNESP Rio Claro  
**PAULO FREIRE AND MATHEMATICAL MODELING: TRACES OR INTERCONNECTIONS?**

Jeannette Galleguillos*, Marcelo Borba  
Universidade Estadual Paulista  
**MATHEMATICAL MODELING IN AN ONLINE EXTENSION COURSE**

Antonnette Gibbs*, Joo Young Park  
Florida Institute of Technology  
**MESH (MATHEMATICS EXPRESSING SOCIETY’S HOPES): A TOOL FOR UNCOVERING THE ROLE OF MATHEMATICS IN SOCIETY**

Tomoaki Harada*  
Tokyo University of Science  
**A STUDY OF THE DEVELOPMENT OF TEACHING MATERIALS RELATED TO “RAILWAY” AS A MATHEMATICAL ACTIVITY**

Ernesto Hernández-Cooper*, Rubén-Dario Santiago-Acosta, Lourdes Quezada-Batalla  
ITESM-CEM  
**NUMERICAL STRATEGIES ON A CALCULUS COURSE**

Ortega Miriam, Diago Pascual, Ferrando Irene*, Puig Luis  
Universitat de València  
**DUALITY IN MODELLING TASKS: STUDENTS’ PERFORMANCES IN TWO TASKS OF DIFFERENT KIND**

Shigekazu Komeda* (1), Takashi Kawakami (2), Koichi Tateishi (3), Atushi Urago (3), Go Ishii (3), Akihiko Saeki (4)  
1: Saga University; 2: Nishikyushu University; 3: Elementary School Attached to Saga University; 4: Naruto University of Education  
**DEVELOPING YEAR 6 STUDENTS’ CONCEPTS OF SPEED IN RELATION TO “WALKING”**

Alexandra Krüger*  
University of Hamburg  
**STUDENT S PERSPECTIVE ON METACOGNITIVE STRATEGIES IN GROUP WORK IN MATHEMATICAL MODELLING**

Stephen T. Lewis*, Sarah Gilchrist, Azita Manouchehri  
The Ohio State University  
**PROVOKING VALIDATION AND REFLECTION IN OPEN MATHEMATICAL MODELLING TASKS**

Margaret Mohr-Schroeder*, Jennifer Wilhelm  
University of Kentucky  
**MODELING FOR UNDERSTANDING WITH NOYCE FELLOWS**

Yoshiki Nisawa*  
Bukkyo university  
**BASIC RESEARCH TO PROMOTE THE USE OF MATHEMATICAL MODELLING: REGARDING THE IDENTIFICATION OF VARIABLES**
Carola Pickhardt*, Sabrina Brix, Henning Jolmes, Lea Nörenberg, Stefanie Schlegel, Isabell Schreiber, Karla Weber, Jan Ziegenhirt, Marleen Zwintschert, Clemens Möller
University of applied sciences Albstadt-Sigmaringen
DEVELOPMENT OF MODELLING TASKS BY STUDENTS

Julia Rausenberger*
Fachhochschule Nordwestschweiz
MODEL-BASED INSTRUCTION IN THE CONTEXT OF MATHEMATICAL MODELING SUPPORTS LEARNING

Márcia Jussara Hepp Rehfeldt*, Elise Cândida Dente, Marli Teresinha Quartieri
Centro Universitário Unives

Mohammadreza Salajegheh*
Ministry of Education
STUDENTS’ UNDERSTANDING AND THEIR PERFORMANCE DURING THE MODELLING CYCLE

Micah Stohlmann*
University of Nevada
MATHEMATICAL MODELLING PROFESSIONAL DEVELOPMENT: WHY MORE IS NEEDED

Rintaro Ueda*
Tokyo Metropolitan Nerima Technical High School
A STUDY ON POSING MODELLING TASK AS A STAFF OF A COFFEE SHOP: FOCUS ON TASK COMPLEXITY IN A MATHEMATICAL LESSON

Lisa Wendt*
University of Hamburg
TEACHER INTERVENTIONS DURING INDEPENDENT WORKING PHASES OF MATHEMATICAL MODELLING ACTIVITIES

Time: Tuesday, 26 July 2016, 18.00–19:00 / Location: I: blue, Philosophical Tower, foyer
TSG 22 – Interdisciplinary mathematics education

Ivana Boboňová*, Sona Eretková
Constantine the Philosopher University in Nitra
ASSESSMENT OF MATHEMATICAL COMPETENCIES OF BIOLOGY TEACHER TRAINEES

Carrie Diaz Eaton* (1), Sam Donovan (2), Stith T. Gower (3), Kristin Jenkins (4), M. Drew LaMar (5), Jennifer Cartier (1), Dorothy Belle Poli (6), Jeremy Wodjak (7), Arietta Fleming-Davies (7), Alison Hale (2), Gaby Hamerlinck (4)
1: Unity College; 2: University of Pittsburgh; 3: North Carolina State University; 4: BioQUEST; 5: The College of William and Mary; 6: Roanoke College; 7: Radford University
QUBES; QUANTITATIVE UNDERGRADUATE MATHEAMTICAL BIOLOGY

Ilze France*, Liga Cakane, Uldis Dzerve, Dace Namsone, Janis Vilcins
University of Latvia
USAGE OF MATHEMATICS COMPETENCY IN A NEW CONTEXT IN SCIENCE EXPERIENCE OF LATVIA
Kathryn Anne Holmes* (1), Adam Lloyd (2), Jennifer Gore (2), Max Smith (2), Leanne Fray (2), Claire Wallington (2)
1: Western Sydney University; 2: University of Newcastle

STUDENTS’ ASPIRATIONS FOR STEM CAREERS

Peter Ludes*
TU Dresden

FOSTERING OF INTERDISCIPLINARY COMPETENCES THROUGH BASIC EDUCATION IN COMPUTER SCIENCE IN MATHEMATICS IN PRIMARY SCHOOL

Patricia McNicholas*
Robert Morris University Illinois

AN INTERDISCIPLINARY ACTIVITY ON ANGIOGENESIS

Amanda Jo Meiners*, Jihyun Hwang, Kyong Mi Choi
University of Iowa

RELATIONSHIPS OF COGNITIVE DOMAINS: FOCUS ON REASONING AND APPLYING IN MATHEMATICS AND SCIENCE

Emmanuel Rollinde*
Sorbonne Universités

ENACTING PLANETS

Craig Russell*
University of Illinois Laboratory High School

GEOMETRY FROM A GLOBAL PERSPECTIVE

Edita Smieskova*, Sona Ceretkova
Constantine the Philosopher University in Nitra

GEOMETRY IN SLOVAK BLUEPRINT

Jennifer Wilhelm* (1), Molly Fisher (2)
1: University of Kentucky; 2: University of Kentucky

PREPARING STEM TEACHERS AS RESEARCHERS: A RESEARCH EXPERIENCES FOR UNDERGRADUATES PROJECT

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TSG 23 – Mathematical literacy

Yi-Chao Chang* (1), Yun-Zu Chen (2)
1: Taipei Municipal Nanhu Senior School; 2: National Taiwan Normal University

ADOLESCENTS’ DECODING STRATEGIES FOR ORTHOGONAL VIEWS OF SMALL CUBES

Christian Dorner*
University of Vienna

WHAT FINANCIAL MATHEMATICS SHOULD BE TAUGHT IN MATH CLASSES?

Xiaofeng Du*, Da Zhou, Jian Liu
Beijing Normal University

THE STUDY OF STUDENTS’ PERFORMANCES IN MATHEMATICS VISUALIZATION ON GRADE EIGHT
Takayuki Kodera*  
Kyoto Tachibana University  
MATHEMATICAL LITERACY IN DEALING WITH NUCLEAR ACCIDENT

Vuyani Hodecius Matsha*  
Nelson Mandela Metropolitan University  
THE EFFECT OF THE DYNAMIC MATHEMATICS SOFTWARE GEOGEBRA ON MATHEMATICAL LITERACY PRESERVICE STUDENTS’ PERCEPTIONS OF ICT

Kathy O’Sullivan*, Paul F. Conway  
University of Limerick  
MAPPING FRAMINGS OF NUMERACY TEACHING AND LEARNING IN DIFFERENT SUBJECTS AT POST PRIMARY LEVEL

José Manuel Diego-Mantecón (1), Maitane P. Istúriz* (1), Teresa Fernandez Blanco (2), Elena Haro Maestro (1)  
1: University of Cantabria; 2: University of Santiago de Compostela  
MATHEMATICAL LITERACY; OBSERVING CUSTOMERS OF HOME PRODUCTS IN REAL LIFE SITUATIONS THAT IMPLY MATHEMATICS

Cornelia Plunger*  
Alpen-Adria-Universität Klagenfurt  
MODEL- AND CONTEXT-ORIENTED REFLECTION IN MATHEMATICS CLASSROOMS

Zulkardi Zulkardi* (1), Ilma Ratu (2)  
1: Sriwijaya University; 2: Sriwijaya University  
SUPPORTING STUDENTS LEARNING MATHEMATICS LITERACY IN INDONESIA

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TSG 24 – History of the teaching and learning of mathematics

Nataliia Chuikova* (1), Sergey Atanasyan (1), Sergey Polikarpov (1), Ildar Safuanov (2)  
1: Moscow Pedagogical State University; 2: Moscow City Pedagogical University  
HISTORY OF SCHOOL MATHEMATICAL EDUCATION AND PREPARING MATHEMATICS TEACHERS IN MOSCOW DURING SOCIAL AND ECONOMIC CHANGES

Tanja Hamann*  
Universität Hildesheim  
“SICKENED BY SET THEORY?” – ABOUT NEW MATH IN GERMAN PRIMARY SCHOOLS

Kei Kataoka*  
Wakayama University  
REFORM IN SECONDARY SCHOOL SOLID GEOMETRY DURING WORLD WAR II, IN JAPAN

Bairon Saul Ordonez (1), Marvin Roberto Mendoza (2), Luis Ramos* (3)  
1: Catholic University of Honduras; 2: National Autonomous University of Honduras; 3: Francisco Morazán National Pedagogical University  
TEACHING MATHEMATICS IN HONDURAS: ORIGINS, DEVELOPMENT, AND CHALLENGES

Boubaker-Khaled Sadallah*  
Ecole Normale Superieure  
THE TRANSLATION OF MATH BOOKS INTO ARABIC THROUGHOUT THE AGES, AND ITS RELATIONSHIP WITH THE TEACHING
Shafie Shokrani*
University of Siegen
MATHEMATICS AND LEONARD NELSON’S SOCRATIC METHOD

**Time: Tuesday, 26 July 2016, 18.00–19:00 / Location: I: blue, Philosophical Tower, foyer**

TSG 25 – The Role of History of Mathematics in Mathematics Education

Ashish Arora*
IKG Punjab Technical University
ACTIVITIES FOR THE CONSTRUCTION OF GEOMETRICAL FIGURES BASED UPON SULBA SUTRA

Hari Koirala*, Marsha Davis, Sita Koirala
Eastern Connecticut State University
USING HISTORY OF MATHEMATICS TO ADDRESS THE COMMON CORE STANDARDS

Kurniati Aisah, Tita Khalis Maryati*, Ramdani Miftah
Syarif Hidayatullah State Islamic University of Jakarta
HOW NEGATIVE NUMBERS CAN BE ACCEPTED IN THE COMMUNITY OF ASIA AND EUROPE?

Jiawei Yu*
Section Chinoise
TEACHING MATHÉMATIQUES EN CHINOIS BY USING CHINESE MATHEMATICAL HISTORY

**Time: Tuesday, 26 July 2016, 18.00–19:00 / Location: I: blue, Philosophical Tower, foyer**

TSG 26 – Research on teaching and classroom practice

Jenny Patricia Acevedo Rincón*, Dario Fiorentini
Unicamp
LEARNING OF THE MATH TEACHERS IN A TRANSDISCIPLINARY PRACTICE IN PRESERVICE EDUCATION

Tugba Aysel*
Dublin City University
USING LESSON STUDY TO EXPLORE PRIMARY/POST-PRIMARY TRANSITIONS IN MATHEMATICS

Okil Bensaci*
University of Kasdi Merbah Ouargla Algeria
THE EFFECTIVENESS OF SOME INSTRUCTIONAL SKILLS FOR IMPROVING THE LEVEL OF METACOGNITION IN MATHEMATICS AMONGST FOURTH G

Aytu Özaltun Çelik (1), Esra Bukova Güzel* (2)
1: Pamukkale University; 2: Dokuz Eylül University
HYPOTHETICAL LEARNING TRAJECTORY RELATED TO QUADRATIC FUNCTIONS

Amber Candela*
University of Missouri – St. Louis
MATHEMATICS TEACHERS’ PERSPECTIVES OF FACTORS AFFECTING IMPLEMENTATION OF HIGH COGNITIVE DEMAND TASKS
Analuise Castro*, Christy Horning
California State University
ANALYSIS ON ASSESSMENT AND ATTITUDE IN AN ALGEBRA CLASSROOM IN AN URBAN SETTING

Katawut Chartsakyut*, Natcha Kamol
Chiang Mai University
BUILDING RAPPORT WITH STUDENTS IN MATHEMATICS CLASSROOM: A CASE STUDY

Catarina Raquel Delgado* (1), Joana Maria Brocardo (1), Hélia Margarida Oliveira (2)
1: Escola Superior de Educação do Instituto Politécnico de Setúbal; 2: Instituto de Educação
TEACHERS’ PRATICES AND NUMBER SENSE DEVELOPMENT IN ELEMENTARY SCHOOL

Claudia Flores*, Adriana Gómez
Instituto Politécnico Nacional
USAGE OF LEARNING NETWORKS FOR MATHEMATICS’ STUDY: CALCULUS, PROBABILITY AND STATISTICS

Vivili Maria Silva Gomes*
Universidade Federal do ABC-UFABC
MATHEMATICS TEACHING PRACTICES AS CURRICULAR COMPONENT: WORKING TOGETHER FOR HIGH SCHOOL

Lisa Lunney Borden* (1), David Reid (2), Ellen Carter (1)
1: St. Francis Xavier University; 2: University of Bremen
SEEKING SIMILARITIES IN PEDAGOGY: A CANADIAN PERSPECTIVE

Kátia Maria de Medeiros* (1), Mirian Raquel Alves da Silva (2)
1: Universidade Estadual da Paraíba; 2: Universidade Estadual da Paraíba
REFLECTING FROM PRACTICE: CONTRIBUTIONS OF MATHEMATICAL FORMULATION AND PROBLEM SOLVING IN THE SUPERVISED PRACTICE

Patricia Sandalo Pereira* (1), Edinalva da Cruz Teixeira Sakai (2)
1: Federal University of Mato Grosso do Sul UFMS; 2: Federal University of Mato Grosso do Sul UFMS
A BRAZILIAN RESEARCH OVERVIEW OF SUPERVISED TRAINING PRACTICAL COURSE

Dilma Fregona (1), Pilar Orús (2), Laura Peydró* (2), Pablo Gregori (2)
1: FAMAF-Universidad Nacional de Córdoba; 2: Universitat Jaume I de Castellon
RESOURCES GENERATED IN THE FRAME OF THE THEORY OF DIDACTICAL SITUATIONS FOR THE TRAINING OF TEACHERS AND RESEARCHERS

Yvonne Reilly*, Jodie Parsons, Thao Huynh
Sunshine College
EFFECTS OF RECIPROCAL TEACHING ON STUDENT PERCEPTIONS ABOUT MATHEMATICS.

Alejandro Miguel Rosas Mendoza* (1), Jorge Luis Rosas Mendoza (1), Leticia del Rocío Pardo Mota (2)
1: Instituto Politécnico Nacional; 2: Secretaría de Educación de Veracruz
USING ACTION MOVIES TO MOTIVATE MATHEMATICAL MODELS IN CLASSROOM

Fanglin Tian, Jian Wang*, Sen Wu
No.2 High School of East China Normal University
INTEGRATING CLASSROOM TEACHING OF HIGH SCHOOL MATH IN CHINA AND THE UNITED STATES
Guangming Wei* (1), Junliang Wang (2)
1: Primary School attached to Zhonghua Secondary School; 2: Experimental Primary School in Jiangdu District

CLASSROOM TEACHING AROUND CORE KNOWLEDGE IN PRIMARY MATHEMATICS EDUCATION IN CHINA

Masaya Yamawaki* (1), Yasushi Yamamoto (2), Tatsuya Mizoguchi (3)
1: Junior High School Attached to Tottori University; 2: Tohaku Junior High School; 3: Tottori University

REPRODUCING LESSONS ABOUT THE UNIT ‘FUNCTIONS AND EQUATIONS’; EDITING TEACHER’S GUIDEBOOKS THROUGH LESSON STUDIES

Time: Tuesday, 26 July 2016, 18.00–19:00 / Location: I: blue, Philosophical Tower, foyer
TSG 27 – Learning and cognition in mathematics

Gabriela Georgeta Dumitrascu*
Eastern Michigan University
UNDERSTANDING THE PROCESS OF GENERALIZATION IN MATHEMATICS THROUGH ACTIVITY THEORY

Diana Henz*
University of Mainz
BODILY MOVEMENTS ENHANCE VISUO-SPATIAL STRATEGIES IN ALGEBRA AND GEOMETRY: AN EEG STUDY

Virginia Montoro* (1), Marcela Cifuentes (1), Ma. Jesus Bianchi (1), Nora Scheuer (1,2)
1: Universidad Nacional del Comahue; 2: Consejo Nacional de Investigaciones Científicas y Técnicas
STUDENTS THINKING ABOUT THE NUMBER LINE

Lianhua Ning*
Nanjing Normal University
SURVEY ON CURRENT SITUATION OF UNDERGRADUATES’ MATHEMATICS LEARNING IN CHINA

David Nutchey*, Edlyn Grant, Tom Cooper
Queensland University of Technology
GENETIC DECOMPOSITIONS OF A MATHEMATICS CURRICULUM

Amanjot Toor*, Joyce Mgombelo
Brock University
INTERMEDIATE MATHEMATICS TEACHERS’ EXPERIENCES OF TEACHABLE MOMENTS

Time: Tuesday, 26 July 2016, 18.00–19:00 / Location: I: blue, Philosophical Tower, foyer
TSG 28 – Affect, beliefs and identity in mathematics education

Mary Coupland*, Anne Prescott, Marco Angelini
University of Technology Sydney
“MATHS INSIDE” – A PROJECT TO ENHANCE MATHEMATICS IDENTITY
Andreas Frank*, Stefan Krauss
University of Regensburg
THE IMPACT OF PROPAEDEUTIC SCIENCE COURSES ON STUDENT BELIEFS

Florence Gabriel*, Jason Signolet, Martin Westwell
Flinders University
A DATA MINING APPROACH TO INVESTIGATING MATHEMATICS DISPOSITIONS

Monica Nymoen Hansen*
UIT – The Arctic University of Norway
STUDENT PARTICIPATION – A WAY TO MOTIVATION?

Hyunju Kim*, InAh Hwang, Won Kyung Kim
Korea National University of Education
A LONGITUDINAL ANALYSIS ON KOREAN STUDENTS’ NON-COGNITIVE CHARACTERISTICS IN MATHEMATICS

Hsin-Yi Kung* (1), Ching-Yi Lee (2)
1: National Changhua University of Education; 2: Feng Chia University
THE CONSTRUCTION AND CONFIRMATION OF HIGHER-ORDER MATHEMATICS AFFECT MODEL FOR JUNIOR HIGH SCHOOL STUDENTS IN TAIWAN

Carmen León Mantero*, Alexander Maz Machado, María José Madrid, Noelia Jiménez Fanjul
Universidad de Córdoba
ANALYSIS OF THE ATTITUDES TOWARD MATHEMATICS OF FUTURE PRIMARY EDUCATION TEACHERS

Juan Gabriel Molina Zavaleta* (1), Mario Sánchez (2), Alejandro Rosas (3), Avenilde Romo (4), Apolo Castañeda (5)
MATHEMATICS AS A CAREER AMONG MEXICAN FEMALE STUDENTS

Roxanne Moore*, Richard Lamb, Kira Carbonneau
Washington State University
MEASURING STUDENT VALUES: WHAT SECONDARY STUDENTS IN HAWAII VALUE IN MATHEMATICS LEARNING

Priscilla E.L. Murphy* (1,2), Leigh N. Wood (1)
1: Macquarie University; 2: Manukau Institute of Technology
A MODEL OF STUDENT LEARNING

Kwon Na Young*, Kim Sang Hun
Sejong Science High School
CHANGES OF STUDENTS’ ATTITUDES IN MATHEMATICS WITH ASSISTANT TEACHERS

Stine Karen Nissen*, Pia Beck Tonnesen, Maria Christina Secher Schmidt
Metropolitan University College
PHOTO ELICITATION INTERVIEWS AS A WAY OF ACCESSING PRIMARY SCHOOL STUDENTS’ ATTITUDES

Audrey Paradis*, Sonja Lutovac, Katri Jokikokko, Raimo Kaasila
University of Oulu
FINNISH AND CANADIAN MATHEMATICS TEACHERS’ PERCEPTIONS OF THEIR AUTONOMY
Safrudiannur Safrudiannur* (1,2), Benjamin Rott (1)
1: Universität Duisburg-Essen; 2: Mulawarman University
A COMPARATIVE STUDY OF MATHEMATICS CURRICULA OF SECONDARY SCHOOL

Alexandra Scherrmann*
Pädagogische Hochschule Ludwigsburg
MEASURED AFFECTS WHILE USING DIFFERENT TYPES OF WORKED EXAMPLES

Dong-Hoon Shin*, Na Young Kwon
Inha University
CHANGES OF PRESERVICE TEACHERS’ MATHEMATICS EPISTEMOLOGICAL BELIEFS

Bok Eun Son*
Ajou University in Korea
DEVELOPMENT OF THE DIAGNOSTIC WORKSHEET FOR KOREAN STUDENTS COUNSELING ON LEARNING MATHEMATICS

Neruja Suriakumaran*, Maike Vollstedt, Christoph Duchhardt
Universität Bremen
PERSONAL MEANING AND MOTIVATION WHEN LEARNING MATHEMATICS

Sampan Thinwiangthong*, Maitree Inprasitha, Suladda Loipha
Khon Kaen University
STUDENTS’ ATTITUDES TOWARD MATHEMATICS LEARNING IN CLASSROOM FOCUSING ON SMALL-GROUP MATHEMATICAL COMMUNICATION

Jose M. Diego Mantecon (1), Carmen Graña (1), Teresa Fernandez Blanco (2), Raquel Vallines Mira* (3)
1: Universidad de Cantabria; 2: Universidad de Santiago de Compostela; 3: University of Texas at San Antonio
TEACHER MATHEMATICS-RELATED BELIEFS AND THEIR RELATIONSHIP WITH CLASSROOM PRACTICE: A CASE STUDY

Time: Friday, 29 July 2016, 18.00–19:00 / Location: E: mint, Economical Building, foyer
TSG 30 – Mathematical competitions

Chih-Ru Hsiao*
Department of Mathematics
SOME OBSERVATIONS OF HIGH SCHOOL STUDENT’S MATHEMATICAL CONTEST OF MODELING IN TAIWAN

Stephen Krevisky*
Middlesex Community College
ANATOMY OF A MATH COMPETITION: LOOKING AT THE MATH CONTEST IN THE CONNECTICUT COMMUNITY COLLEGE SYSTEM, USA

Meena More*
Modern College of Engineering
MATHEMATICS AND ENGINEERING IN REAL LIFE

Marli Moreira*
University of Porto
MATH@XXI: AN INCLUSIVE COMPETITION FOR MATHEMATICS ENCULTURATION
Susanne Tak*, Michiel Doorman
Utrecht University
MATHEMATICS B-DAY: A TEAM COMPETETION FOR UPPER SECONDARY EDUCATION

Batkhhuu Tserennadmid*
Mongolian State University of Education
MATHEMATICS COMPETITION PROBLEM SOLVING KNOWLEDGE AND SKILLS IN PRE-SERVICE MATHEMATICS TEACHER EDUCATION

**Time: Tuesday, 26 July 2016, 18.00–19:00**
**Location: E: mint, Economical Building, foyer**

TSG 31 – Language and communication in mathematics education

Masato Ando*
Tokyo University of Science
STUDY ON THE GUIDANCE TO INCREASE THE POWER OF EXPRESSION IN MATHEMATICAL COMMUNICATION THROUGH THE SGE

Ayla Ata Baran*, Tangül Uygur Kabael
Anadolu University
A MATHEMATICS TEACHER’S AND A PRE-SERVICE MATHEMATICS TEACHER’S MATHEMATICAL DISCOURSE

Gemma Carotenuto*, Roberto Capone, Cristina Coppola, Flora del Regno, Umberto Dello Iacono, Laura Lombardi, Tiziana Pacelli, Francesco Saverio Tortoriello
Università di Salerno
NUMERO ERGO SUM: A PROPOSAL FOR THE IMPROVEMENT OF REPRESENTATION CAPABILITY

Regina Essack*
University of Witwatersrand
EXPLORING GRADE 11 DISCOURSES ON FUNCTION

Minoru Ito* (1), Tetsuya Kobayashi (2)
1: Tokyo University of Science; 2: Ryugasaki Daichhi High School
HOW WORKS SUPPER SCIENCE HIGH SCHOOL CURRICULUM USING JAPANESE TRADITIONAL MATHEMATICS: WASAN

Nadine Krosanke*
Universität Hamburg
PREPARING FUTURE MATHEMATICS TEACHERS TO WORK IN LINGUISTICALLY DIVERSE CLASSROOMS
Phattaraphong Kunseeda*, Narumon Changsri
Khon Kaen University
STUDENTS’ WRITING SKILL IN MATHEMATICAL PROBLEM SOLVING CLASSROOM

Woong Lim* (1), Paula Guerra (2), Jihye Kim (2)
1: University of New Mexico; 2: Kennesaw State University
USING PROGRAMMING LANGUAGE TO BETTER UNDERSTAND MATHEMATICAL SYMBOLS, SYNTAX, AND NOTATIONS

Saeed Manshadi*
UiT – The Arctic University of Norway
CONTEXT AS MEAN FOR COMMUNICATION IN MATHEMATICS CLASSROOMS

Abdelhafid Mokrane*
Ecole Normale Superieure
THE EVOLUTION OF THE LANGUAGE OF MATHEMATICS TEACHING IN ALGERIA AFTER INDEPENDENCE (1962)

Jhonel Morvan*
Brock University
UNDERSTANDING SCHOOL LEADERS’ DISCOURSE IN REGARD TO MATHEMATICS ACHIEVEMENT

Rolf Oechsler*, Jürgen Roth
Universität Koblenz-Landau
STUDENTS’ COMMUNICATION IN A MATH LAB – A QUALITATIVE ANALYSIS

Chunyoung Oh* (1), Heesook Park (2)
1: Chonnam National University; 2: Sunchon National University
MATHEMATICAL COMMUNICATION IN THE LEARNING: MIDDLE AND LOW ACHIEVEMENT STUDENTS

Toril Eskeland Rangnes*, Rune Herheim
Bergen University College
DISCUSSING RISK AND PROBABILITY – MORE THAN NUMBERS

Carina Rauf*, Babara Schmidt-Thieme
Universität Hildesheim
GAINING LANGUAGE AWARENESS: A CURRICULUM FOR LANGUAGE AND LANGUAGE TEACHING FOR TEACHERS OF MATHEMATICS

Kirsten Spahn*, Birgitte Henriksen
University College Copenhagen
LEARNING TO READ MATHEMATICAL TEXTS

Alexander Lee-Heng Tai* (1), Belinda P. Edwards (2)
1: Columbia Public Schools – English Language Learners Department; 2: Kennesaw State University – College of Science and Mathematics
PROMOTING ACADEMIC LITERACY DURING MATHEMATICS ACTIVITY
Mio Yamamoto*
Graduate School of Education
AN EPISTEMOLOGICAL CONFLICT IN THE SOCIAL INTERACTION: A CASE STUDY OF FRACTION LESSONS IN A THIRD GRADE CLASSROOM

Vivica Zweidar*
University of Bremen
IMPLICIT COMMUNICATION IN CLASSROOM CONVERSATION ABOUT FUNCTIONS

Time: Friday, 29 July 2016, 18.00–19:00 / Location: E: mint, Economical Building, foyer
TSG 32 – Mathematics education in a multilingual and multicultural environment

Valeria Di Martino*
University of Turin
ENHANCE PROBLEM SOLVING AND ARGUMENTATION IN ITALIAN MULTICULTURAL CLASSROOMS

Hilja Huru*, Anita Movik Simensen
UiT – The Arctic University of Norway
SECOND LANGUAGE IMMERSION IN MATHEMATICS FOR ENDANGERED LANGUAGES

Taha Kuzu*, Alexander Schüler-Meyer, Susanne Prediger, Lena Wessel
Technical University Dortmund
FOSTERING BILINGUAL LEARNERS – ARE HOME LANGUAGES REALLY RESOURCES, EVEN IF NOT USED FOR MATHEMATICS BEFORE?

Balarabe Yushau* (1), M. Hafidz Omar (2), Yusuf Zakariya (2)
1: Abubakar Tafawa Balewa University; 2: King Fahd University of Petroleum and Minerals
RESULTS OF THE ENGLISH-ARABIC AND ARABIC-ENGLISH MATHEMATICS EXAMS OF BILINGUAL ARAB UNIVERSITY STUDENTS

Time: Tuesday, 26 July 2016, 18.00–19:00 / Location: E: mint, Economical Building, foyer
TSG 33 – Equity in mathematics education (including gender)

Suzanne Beth Antink*
Palo Alto Unified School District
CONTRIBUTING REPLICABLE FACTORS IN K-12 FEMALE STUDENT MATHEMATICS SUCCESS IN THE PALO ALTO UNIFIED SCHOOL DISTRICT

Neila de Toledo e Toledo*
Instituto Federal de Educação
A BRAZILIAN TECHNICAL AGRICULTURAL SCHOOL, ITS MATHEMATICS EDUCATION AND SOCIAL INEQUALITIES

Susan Holloway*
Saint Vrain Valley School District
EVIDENCE OF AND RESPONSES TO LANGUAGE LEARNING ADOLESCENT GIRL’S MATH ACHIEVEMENT: THE “OPHELIA EFFECT” IN COLORADO
Ji-Eun Lee (1), Jinho Kim* (2), Woong Lim (3), Sang-Mee Kim (4)
1: Oakland University; 2: Daegu National University of Education; 3: University of New Mexico; 4: Chuncheon National University of Education

A CROSS-NATIONAL STUDY OF CONCEPTUALIZING EQUITABLE MATHEMATICS CLASSROOMS

Inge Koch*, Janine McIntosh, Michael O’Connor
Australian Mathematical Sciences Institute

CHOOSE MATHS: AN AUSTRALIAN APPROACH TOWARDS INCREASING THE PARTICIPATION OF WOMEN IN MATHEMATICS

Luis Leyva*
Vanderbilt University – Peabody College

BLENDING ACADEMIC AND SOCIAL SUPPORT THROUGH APOYO AND CONSEJOS FOR UNDERGRADUATE MATHEMATICS SUCCESS AMONG LATIN@S

Daouda Sangare*
Nangui Abrogoua University of Abidjan

GENDERS DIFFERENCES IN MATHEMATICS PERFORMANCE IN SUB – SAHARIAN FRANCOPHONE COLLEGES AND UNIVERSITIES, THROUGH THE PAN

Time: Friday, 29 July 2016, 18.00–19:00 / Location: E: mint, Economical Building, foyer

TSG 34 – Social and political dimensions of mathematics education

Ana Ferreras*
U.S. Academy of Sciences

THE U.S. NATIONAL COMMISSION ON MATHEMATICS INSTRUCTION

Emelie Kenney*
Siena College

POLISH MATHEMATICS RESEARCH AND DIDACTICS: WHY AMERICAN (AND OTHER) STUDENTS SHOULD KNOW ITS HISTORY

Mary Raygoza*
University of California

QUANTITATIVE CIVIC LITERACY

Miho Yamazaki*
University of Tsukuba

A FRAMEWORK OF SOCIOCULTURAL CHARACTERISTICS OF MATHEMATICAL VALUES

Time: Tuesday, 26 July 2016, 18.00–19:00 / Location: E: mint, Economical Building, foyer

TSG 36 – Task design, analysis and learning environments

Andreja Drobnic Vidic*
University of Ljubljana

STUDENTS’ AND TEACHERS’ DIFFICULTIES IN DEALING WITH REALISTIC TASKS
Laurie Jacques*
UCL – Institute of Education
LEARNING TO APPLY VARIATION THEORY TO THE DESIGN OF MATHEMATICAL
TASKS IN ENGLISH PRIMARY CLASSROOMS

Ellen Jameson*, Daniel T. Hickey
University of Cambridge
IMPROVING SUPPORT FOR MULTIPLE REPRESENTATIONS IN A BASE-TEN NUMBER
SYSTEM GAME: THE ROLE OF ASSESSMENT IN DESIGN

Solveig Jensen*
Universität Osnabrück
A MATHEMATICAL PLAYWORLD FOR SUPPORTING CHILDREN TAKING UP A PROCESS
VIEW WHEN DEALING WITH NATURAL NUMBERS

Luis Alberto López-Acosta*, Gisela Montiel
Centro de Investigación y de Estudios Avanzados del Instituto politécnico Nacional (Cinvestav del IPN)
VARIATIONAL THINKING AND LANGUAGE – A DESIGN-BASED SOCIOEPISTEMOLOGICAL
RESEARCH

Hitoshi Matsukawa*
Graduate School of Education
DESIGNING MATHEMATICAL ACTIVITIES BASED ON THE SELF-DEVELOPED MODEL
IN HIGH SCHOOL: THE HANOI TOWER AS AN EXAMPLE

Linda G. Opheim*
University of Agder
DVM-U – A TECHNOLOGICAL ENVIRONMENT DESIGNED TO AID ADAPTED TEACHING
AND MOTIVATE PUPILS

Cynthia Pulido*, Breanne Ulloa, Christina Perez, Cristina Cortes
California State University
USING COLLECTIONS TO HELP STUDENTS UNDERSTAND THE VALUE OF DIGITS

Yury Rojas*
New York University
A REVIEW OF RECENT RESEARCH IN FRACTION MULTIPLICATION; IMPLICATIONS
FOR TASK DESIGN.

Meetal Shah*, Jere Confrey
North Carolina State University
MIDDLE GRADES STUDENTS’ INTERPRETATIONS OF ADDITION OF FRACTIONS USING
AN INTERACTIVE NUMBER LINE

Sharon Walker*, Tatiana Rostovtseva
Faculty of Mathematics
CAMBRIDGE MATHEMATICS EDUCATION PROJECT: DEVELOPING A FRAMEWORK
FOR ‘DEEP’ UNDERSTANDING IN KEY STAGE 5 MATHEMATICS

Petra Scherer, Kristina Hählen, Christian Rütten, Stephanie Weskamp*
Universität Duisburg-Essen
SUBSTANTIAL LEARNING ENVIRONMENTS FOR HETEROGENEOUS GROUPS –
FOURTH GRADERS EXPLORE MATHEMATICS AT THE UNIVERSITY
Having “Fun” in Mathematics Lessons: Two Examples in Hong Kong

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**TSG 37 – Mathematics Curriculum Development**

Ekrem Alimi* (1), Aferdita Aljimi (2)
1: University of Gjilan "Kadi Ozeq"; 2: Lower and Primary School

Comparison of Different Meanings of Function Based on School Mathematics Textbooks

Sooil Choi* (1), Bo Hyeon Kim (2), Moonhwan Park (3), Kyung Eun Lee (4), Hyungshin Kim (5), Junga Yi (6), Junhee Han (7)
1: Mathematics Education Research Institute(Korea); 2: Donggung Middle School; 3: Seoul Nat’l Univ. Middle School; 4: Seoul Nat’l Univ. Middle School; 5: Sinchang Middle School; 6: Seongbok High School; 7: Yushin High School

International Comparison of Mathematics Curriculum of South Korea and Other Countries

Satoshi Fujinawa*
Tokyo University of Science

Inquest of Introduction Mathematic in Educational Continuity from Primary through Early Econdary Levels

Fumi Ginshima* (1), Keiko Hino (2)
1: National Institute for Educational Policy Research; 2: Utsunomiya University

Contribution of Assessment to the Process of Curriculum Design: An Experience in Japan

Penina Adhiambo Kamina*
SUNY Oneonta

A Befitting Mathematics Curriculum for the 21st Century

Luís Menezes*
Higher School of Education of Viseu

Humor in Mathematics Teaching

Amirali Momenzadeh*, Jamal Mahmoudi
Shahid Beheshti University

The Role of Calculator in New Mathematics Curriculum in Iran

Shogo Murata*
University of Tsukuba

The Place of “Mathematical Method” in the School Mathematics Curriculum

Mario Schmitz*
Eberswalde University for Sustainable Development

An Approach for an Inductive Curriculum Design
Yiting Yu*
Beijing Bayi School
THE INFLUENCE OF TYPES OF HOMEWORK ON OPPORTUNITY TO LEARN AND STUDENTS’ MATHEMATICS ACHIEVEMENT

Time: Friday, 29 July 2016, 18.00–19:00 / Location: E: mint, Economical Building, foyer
TSG 38 – Research on resources (textbooks, learning materials etc.)

María Selene Georgina Chávez Rodríguez*, Hugo Adán Cruz Suárez, José Antonio Juárez López
Benemérita Universidad Autónoma de Puebla
EXPLORING THE AUTHENTICITY OF A VERBAL PROBLEM FROM THE PERSPECTIVE OF TOPOGRAPHY ENGINEERS

Sanskar Dhakal* (1), Durga Prasad Dhakal (2)
1: Kathmandu Satpragya School; 2: Kathmandu University
RUBIK’S CUBE AND SCHOOL MATHEMATICS

Laura Delgado (1), María Asunción García Olivares* (2), María Consuelo Monterrubio Pérez (3)
1: University of Salamanca; 2: University of Valladolid; 3: University of Salamanca
MOVIES AND MATHEMATICAL COMPETENCE: DESIGNING CURRICULAR MATERIALS

Miguel A. Marco-Buzunáriz, Jose M. Muñoz-Escolano*
Universidad de Zaragoza
RESEARCH ON TEXTBOOKS AT SPANISH SOCIETY FOR RESEARCH IN MATHEMATICS EDUCATION SIMPOSIA (1997–2015)

Inga Niedermeyer*, Ann-Katrin van den Ham, Aiso Heinze
Leibniz Institute for Science and Mathematics Education Kiel
EFFECTS OF TEXTBOOKS ON MATHEMATICS TEACHING AND LEARNING IN GERMAN PRIMARY SCHOOLS

Heather Gallivan (1), Jihwa Noh* (2)
1: University of Northern Iowa; 2: Pusan National University
ANALYZING CONTEXTS USED IN TEXTBOOK PROBLEMS ON FRACTION MULTIPLICAITON

Valdinei Cardoso (2), Lilian Kato (2), Samuel Oliveira* (1)
1: University of Campinas; 2: University of Maringá
WHAT A SEMIOTICS THEORY OF REGISTERS REPRESENTATION TELLS US ABOUT SOME LINEAR ALGEBRA’S TEXTBOOKS?

Kristina Palm Kaplan*
Uppsala University
CONTEXTS AND LEARNER POSITONS VARYING WITH CONTENT

Maximilian Pohl*
Universitaet Duisburg-Essen
ANALYSING STUDENTS’ USES AND THE DESIGN OF DIGITAL TEXTBOOKS

Xinming Wang*
College of Mathematics and Information Science
THE BASIC CONNOTATION OF LEARNING DESIGN
**TSG 39 – Large scale assessment and testing in mathematics education**

Maryam Bahalouhoureh*, Hadis Mohamadi  
Shahid Beheshti University  
4TH GRADE IRANIAN STUDENTS’ UNDERSTANDING OF FRACTIONS

Georg Bruckmaier* (1), Stefan Krauss (1), Werner Blum (2), Dominik Leiss (3)  
1: University of Regensburg; 2: University of Kassel; 3: Leuphana University Lüneburg  
MEASURING TEACHERS’ PROFESSIONAL COMPETENCE BY USING VIDEO CLIPS

Johan Deprez*, Daniël Van Nijlen, Eef Ameel, Rianne Janssen  
University of Leuven  
LARGE SCALE ASSESSMENT OF ATTAINMENT TARGETS ON UPPER SECONDARY LEVEL MATHEMATICS IN FLANDERS (BELGIUM)

InAh Hwang*, Hyunju Kim, Won Kyung Kim  
Korea National University of Education  
A STUDY ON MAJOR CAUSES OF INFLUENCING KOREAN STUDENTS’ AFFECTIVE CHARACTERISTICS IN MATHEMATICS BY A BIG DATA ANALYSIS

Israel Inekwe*  
Michael Okpara University of Agriculture  
CREATIVE ANALYSIS AND EQUIVALENT COMPARTMENTALIZATION OF THE AH4

Jitlada Jaikla*, Sukanya Thammanoonluk, Narumon Changsri, Maitree Inprasitha  
Khon Kaen University  
A STUDY OF STUDENTS’ MATHEMATICS COMPETENCY: A PILOT STUDY IN THAILAND

Alison Reddy*  
University of Illinois  
THE UNIVERSITY OF ILLINOIS ASSESSMENT AND PLACEMENT PROGRAM

Anselm R. Strohmaier*, Jana T. Beitlich, Matthias C. Lehner, Kristina M. Reiss  
TU Munich  
THE AGE OF THE CAPTAIN – ADULTS’ FOCUS ON NUMBERS IN PISA ITEMS

Da Zhou*, Qimeng Liu, Jian Liu  
Beijing Normal University  
SELF-EFFICACY AND MATHEMATICS ACHIEVEMENT: AN EXPLORATORY STUDY

**TSG 40 – Classroom assessment for mathematics learning**

Mari Chikvaidze* (1,2), Syed K. Husain (2), James Underwood (3)  
1: King’s College London; 2: Lampton Academy; 3: University of Northampton  
ASSESSMENT FOR LEARNING USING MULTIPLE CHOICE QUESTIONS

Erol Karakirik (1), Mustafa Dogan* (2), Orhan Canakci (3)  
1: Abant Izzet Baysal University; 2: Yildiz Technical University; 3: Marmara University  
ANATOMY OF A GENERIC QUESTION MODEL IN DINASORUS ASSESSMENT SYSTEM
Ann Downton*  
Monash University  
USING A DIGITAL FLIP CAMERA AS AN ASSESSMENT TOOL IN A MATHEMATICS LESSON

Elodie Ho*  
California State University  
STANDARDS AND DISPOSITION ASSESSMENT

Chia-Jui Hsieh*  
National Taiwan Normal University  
CONCEPT IMAGES FOR FORMATIVE ASSESSMENT OF MATHEMATICS INTERN TEACHERS IN TAIWAN

Renate Nitsch*, Regina Bruder  
TU Darmstadt  
ANALYSIS OF STUDENTS’ ERROR PATTERNS IN THE FIELD OF FUNCTIONS

Victor Odafe*  
Bowling Green State University Firelands  
HISTORY OF ASSESSMENT IN MATHEMATICS

Márcio Pironel* (1), Lourdes de la Rosa Onuchic (2)  
SEARCHING PRINCIPLES FOR THE ASSESSMENT OF MATHEMATICS LEARNING

Angela Piu* (1), Cesare Fregola (2)  
1: University of Valle D’Aosta; 2: University of L’Aquila  
UNDERSTANDING OF MATHEMATICAL CONCEPTS AND TRANSCODING PATTERN TOWARDS A FUZZY ASSESSMENT MODEL.

Ulrike Roder*, Nora Feldt-Caeser  
Technische Universität Darmstadt  
DIAGNOSIS AND SUPPORT OF BASIC MATHEMATICAL KNOWLEDGE AT THE BEGINNING OF UPPER SECONDARY SCHOOL (GERMAN GYMNASIUM)

Elvira Lazaro Santos*  
Escola Básica 2º e 3º ciclos de Álvaro Velho  
ASSESSMENT FOR LEARNING PRATICES AND TEACHING REGULATION

José Abel Semitiel*, Cintia Georgina Cianciardo, Angélica Rosa Arnulfo  
Facultad de Ciencias Exactas  
DIFFICULTIES OBSERVED IN THE PROCESS OF STUDYING THE CONCEPT OF LINEAR INDEPENDENCE

Yvonne Su*  
California State University  
ASSESSING MATHEMATICAL UNDERSTANDING USING MANIPULATIVES

Joann Sur*, Lisa Byeon  
California State University  
CORRELATION BETWEEN STUDENT ACHIEVEMENT AND ATTITUDE
Iva Žlábková*
University of South Bohemia in České Budejovice
PEER ASSESSMENT IN INQUIRY BASED MATHEMATICS EDUCATION

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TSG 41 – Uses of technology in primary mathematics education (up to age 10)

Leonor Camargo* (1), Ivonne Sandoval (2)
1: Universidad Pedagógica Nacional; 2: Universidad Pedagógica Nacional
APPROACHING THE THEORETICAL WORLD OF GEOMETRY IN FIFTH GRADE

Khristin Fabian*
University of Dundee
IMPLEMENTATIONS OF MOBILE LEARNING IN MATHEMATICS

Ben Pierre Emile Haas* (1), Romain Martine (2), Yves Kreis (3)
1: Menje; 2: Lucet; 3: Uni.lu
IMPROVING THE SKILL LEVELS IN THE DOMAIN OF RESOLUTION OF ARITHMETIC PROBLEMS, TESTED BY NATIONAL STANDARDIZED TESTS (EP)

Heidi Otto*
Universität Hildesheim
SCRATCH IN PRIMARY SCHOOLS. APPROACHING A FUNDAMENTAL IDEA BY PROGRAMMING

Jin Sunwoo* (1), JeongSuk Pang (1), Kyuha Lee (2)
1: Korea National Univ. of Education (KNUE); 2: WEDU Communications
THE DEVELOPMENT OF ELECTRONIC BOOKS OF PRIMARY MATHEMATICS VIA FREE CHOICE INFORMAL LEARNING

Erich Ch. Wittmann*
Technical University of Dortmund
COUNTERS & CO. DIGITALLY. A UNIVERSAL SOFTWARE FOR PRIMARY MATHEMATICS

Time: Friday, 29 July 2016, 18.00–19:00 / Location: E: mint, Economical Building, foyer
TSG 42 – Uses of technology in lower secondary mathematics education (age 10 to 14)

Mieke Abels*
Freudenthal Institute
DEVELOPING A DIGITAL MATHEMATICS ENVIRONMENT IN INTERACTION WITH (DESIGN) RESEARCH

Charles Anifowose*, Angelica Mendaglio
Vretta Inc.
MATHEMATIC: A DATA-DRIVEN CLASSROOM WITH DIGITAL MATH PEDAGOGY

Adrian Bull*, Arne Mogensen
VIA University College
INCREASED LEARNING OUTCOME FOR BOYS USING CAS IN MIDDLE SCHOOL
Eden Chavez De Joya*
Philippine Science High School
INTEGRATING GEOGEBRA AND DESMOS IN ALGEBRA CLASSES IN PHILIPPINE SCIENCE HIGH SCHOOL

Carlos Valenzuela (1,2), David Arnau (2), Olimpia Figueras* (1), Juan Gutierrez (2)
1: Centro de Investigación y de Estudios Avanzados del IPN; 2: Universitat de València
DESIGNING APPLETS FOR TEACHING FRACTIONS

Klaus-Tycho Foerster*
ETH Zurich
PROGRAMMING AS AN EVERYDAY TOOL IN MATHEMATICAL EDUCATION

Daysi Julissa García Cuéllar*, Jesús Victoria Flores Salazar
Pontificia Universidad Católica del Perú
THE INSTRUMENTATION OF THE AXIAL SYMMETRY IN HIGH SCHOOL STUDENTS

Iwan Gurjanow*, Matthias Ludwig
Goethe University Frankfurt am Main
USING THE MATHCITYMAP-APP TO EXAMINE THE IMPACT OF GAMIFICATION ON INTRINSIC MOTIVATION

Meritxell Joanpere*, Lluís Albarracín
Universitat Autònoma de Barcelona
DESIGNING MATHEMATICAL ACTIVITIES FROM A VIDEOGAME

Kyung-Eun Lee*
Seoul National University Middle School
MATHEMATICS LEARNING ENVIRONMENT FOR COMPUTATIONAL THINKING BASED ON EXECUTABLE EXPRESSIONS AND 3D PRINTERS

Feng-Lin Lu*, Tai-Yih Tso, Shih-Ying Yen
National Taiwan Normal University
THE EFFECTS OF SELF-MANIPULATION FOR DEVELOPING EIGHTH GRADERS’ VAN HIELE LEVELS IN DYNAMIC GEOMETRY ENVIRONMENTS

Vanessa Oechsler* (1), Marcelo de Carvalho Borba (2)
1: Instituto Federal de Santa Catarina – Câmpus Gaspar; 2: Universidade Estadual Paulista
Julio de Mesquita Filho
THE PRODUCTION OF VIDEOS IN MATHEMATICS EDUCATION

Helia Oliveira* (1), Ana Isabel Mota (2), Ana Henriques (1)
1: University of Lisbon; 2: University of Minho
STUDENTS’ PERSPECTIVES ABOUT EXPLORING STATISTICS WITH TINKERPLOTS SOFTWARE: SOME CONNECTIONS WITH STUDENTS’ RESILIENCE

Deniz Özen*, Ersen Yazıcı, Taner Arabacioglu
Adnan Menderes University Faculty of Education
TYPES OF MOBILE APPS TOWARDS MATHEMATICS: A QUALITATIVE STUDY

Oliver Thiel* (1), Yvonne Grimmeland (1), Joel Josephson (3), Jörn Loviscach (4), Nelly Kostova (5), Piedade Vaz-Rebelo (6), Marco Jessat (2), Armin Hottmann (2)
1: Queen Maud University College; 2: Kulturring e.V.; 3: Kindersite; 4: Bielefeld University of Applied Sciences; 5: School "Sv.Kliment Ohridski"; 6: University of Coimbra
VIDUMATH – CREATIVE VIDEO FOR MATHEMATICS
USING THE WOLFRAM LANGUAGE TO WORK WITH DATA

Time: Friday, 29 July 2016, 18.00–19:00 / Location: I blue, Philosophical Tower, foyer
TSG 43 – Uses of technology in upper secondary mathematics education (age 14 to 19)

Ma. Louise Antonette Navarro De Las Penas* (1), Debbie Marie Verzosa (2)
1: Ateneo de Manila University; 2: Ateneo de Davao University
THE USE OF DYNAMIC TOOLS FOR GRADES 7-10 MATHEMATICS IN THE CONTEXT OF A DEVELOPING COUNTRY

Houssam Elkasti*
Lebanese University
EFFECT OF GEOGEBRA PROFESSIONAL DEVELOPMENT ON INSERVICE SECONDARY MATHEMATICS TEACHERS’ TECHNOLOGY INTERGATION LEVEL

Jorge Gaona*
Université Paris 7 Diderot – Paris 7
ANALYSIS OF THE ELABORATION OF BASE E-EXERCISES IN FUNCTIONS

Janelle Hill*
Monash University
IPADS IN MATHEMATICS EDUCATION – VIEWS OF STUDENTS

Jin-ichi Itoh*
Kumamoto University
SOME STUDIES OF HEURISTIC LEARNING OF PLANE GEOMETRY WITH ICT

Chiharu Kanamori*
Shibaura Institute of Technology Junior and Senior High School
ICT EDUCATION PROBLEMS ACCORDING TO SURVEY FINDINGS AND SUGGESTIONS FOR A NEW CLASS STYLE

Daisuke Koda*
Shibaura Kashiwa Senior and Junior High School
THE USE OF ICT LIKE GEOGEBRA IN THE MATHEMATICAL ACTIVITY

Matthias Müller*
Friedrich-Schiller-Universität Jena
CAS CLASSROOM AND STUDENT CENTERED LEARNING ENVIROMENT IN THURINGIA

Santosh Paudel* (1), Pundary Phuyal (2), Deependra Budhathoki (3)
1: Kathmandu University; 2: Kathmandu University; 3: Kathmandu University
THE USE OF ICT IN MATHEMATICS CLASSROOM

Marie Pierard*, Valérie Henry
University of Namur
TEACHING TRIGONOMETRY WITH DYNAMIC GEOMETRY

Sergio Andrés Rubio Pizzorno*
Cinvestav
GAME OF PARAMETERS : QUADRATIC FUNCTION
Ian Sheppard*  
Geelong College  
USING CAS TO SUPPORT STUDENT INVESTIGATION

Liliana Suarez-Tellez* (1), Mercy Lily Pena-Morales (2), Victor Hugo Luna-Acevedo (1), Carmen Varela (3)  
1: Instituto Politécnico Nacional; 2: University of Victoria; 3: Colegio de Bachilleres  
technology as important issue for mexican teachers of secondary school

Kinga Szücs*  
Friedrich-Schiller-Universität Jena  
USE OF PODCASTS IN MATHEMATICS EDUCATION HAVING REGARD TO HETEROGENEITY

Christophe Viudez* (1), Jean-François Nicaud (1), Nataly Essonier (2), Jana Trgalova (2)  
1: Aristod; 2: S2HEP  
aplusix neo: application for fun algebra practicing

Time: Friday, 29 July 2016, 18.00–19:00 / Location: I: blue, Philosophical Tower, foyer  
TSG 44 – Distance learning, e-learning, blended learning

William Man Yin Cheung*  
University of Hong Kong  
incorporating smartphones into teaching large class: a case study of teaching first-year university science students

Madan Gupta*, Peter Adams  
University of Queensland  
adaptive tutorials: an e-learning approach fostering student engagement in mathematics

Margret Hjalmarson*, Courtney Baker  
George Mason University  
synchronous online courses for mathematics teacher leaders

Moonja Jeong*  
University of Suwon  
A note on implementation of flipped learning on calculus of one variable

Nilsa Adelaide Issufo Enoque Pondja Cherinda*  
Eduardo Mondlane University  
teaching statistics by distance education at digital era: challenges and perspectives

Rubén-Dario Santiago-Acosta*, Lourdes Quezada-Batalla, Ernesto Hernández-Cooper  
ITESM  
Massive open online course on differential equations (DE)

Alice Seneres*, Philip Smith  
Teachers College Columbia University  
What effect does the hybrid course format have on classroom interactions?
Shizuka Shirai* (1), Tetsuo Fukui (2)
1: Mukogawa Women’s University; 2: Mukogawa Women’s University
MATHTOUCH WEB: ONLINE MATH INPUT EDITOR FOR INTERACTIVELY CONVERTING LINEAR STRINGS

Matthew Sokol*
State University of New York – Westchester Community College
ONLINE ACCELERATED DEVELOPMENTAL MATHEMATICS

Alma Yerel Soto Lazcano*, Víctor Hugo Luna Acevedo, María Reyna Navarro García
Instituto Politécnico Nacional
DIGITAL COMPETENCIES FOR INNOVATION: VIRTUAL LEARNING COMMUNITIES OF MATH, BIOCHEMISTRY AND FINANCIAL LITERACY

Kentaro Yoshitomi*, Mitsuru Kawazoe
Osaka Prefecture University
WEB-BASED ASSESSMENT SYSTEM DEVELOPED WITH WEBMATHMATICA

Julia Zerlik*
Goethe-Universität
PROFESSIONAL KNOWLEDGE IN MATHEMATICS EDUCATION OF PRE-SERVICE TEACHERS IN BLENDED LEARNING COURSES

Time: Friday, 29 July 2016, 18.00–19:00 / Location: I: blue, Philosophical Tower, foyer
TSG 45 – Knowledge in/for teaching mathematics at primary level

Zahra Gooya*
Shahid Beheshti University
MATHEMATICS KNOWLEDGE NEEDED FOR ELEMENTARY TEACHERS IN IRAN

Gwen Ineson*
Brunel University
MATHEMATICAL TALK: LINKS WITH SUBJECT KNOWLEDGE?

Jisoo Kim*, Juri Lee, Soo Jin Lee
Korea National University of Education
TWO ELEMENTARY SCHOOL TEACHERS’ KNOWLEDGE OF FRACTION MULTIPLICATIONS AND DIVISIONS WITH DRAWN REPRESENTATIONS

Tracy L. Weston*
Middlebury College
DEVELOPING KNOWLEDGE OF REPRESENTATIONS IN INITIAL TEACHER EDUCATION

Time: Friday, 29 July 2016, 18.00–19:00 / Location: I: blue, Philosophical Tower, foyer
TSG 46 – Knowledge in/for teaching mathematics at secondary level

Aleksandra Cižmešija* (1), Ana Kataleni (2), Željka Milin Šipuš (1)
1: University of Zagreb; 2: University of Osijek
ASYMPTOTE AND ITS DIDACTIC TRANSPOSITION IN THE SECONDARY EDUCATION IN CROATIA
Patricia Rosana Linardi* (1), Regina Ehlers Bathelt (2)  
1: Universidade Federal de São Paulo; 2: Universidade Federal de Santa Maria

A SET OF INSTRUMENTS TO INVESTIGATE THE PROFESSIONAL PRACTICE OF MATHEMATICS TEACHERS: LIMITS AND POSSIBILITIES

Bernie O’Donoghue* (1), Patrick Johnson (1), Máire Ní Riordáin (2), John O’Donoghue (1)  
1: University of Limerick; 2: NUI Galway

LET’S LEARN LITERACY FOR MATHEMATICS TEACHING FROM PÓLYA AND MEYER

Diwash Shakya*, Jeeban Bhuju  
Glacier International College

IMAGES OF MATHEMATICS AND ACHIEVEMENT: FROM AN OUTSIDER’S VIEW

Rachel Snider*  
University of Michigan

EXAMINING THE PRACTICE OF AND KNOWLEDGE USED IN SELECTING EXAMPLES

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Time: Friday, 29 July 2016, 18.00–19:00 / Location: I: blue, Philosophical Tower, foyer

TSG 47 – Pre-service mathematics education of primary teachers

Yukiko Asami-Johansson*, Iiris Attoeps  
University of Gävle

COMPARATIVE STUDY IN TEACHER EDUCATORS’ PERCEPTIONS OF PCK

Johanna Brandt*  
Technical University of Dortmund

ENHANCING COMPETENCES FOR DIAGNOSIS AND INDIVIDUAL SUPPORT – RESEARCH ON AN UNIVERSITY LEARNING ENVIRONMENT

Eugenio Chandia*  
Pontificia Universidad Católica de Chile

EFFECT OF INITIAL TEACHER EDUCATION PROGRAMS ON PRIMARY SCHOOL TEACHERS’ BELIEFS ABOUT MATHEMATICS INSTRUCTIONAL PRACTIC

Emilio Celso de Oliveira, Ana Chiiummo*  
Universidade Paulista

TEACHER’S KNOWLEDGE: TEACHING EXPERIENCES AT GRADUATION

Emmanuel Deogratias*  
University of Dodoma

INFORMING A CONCEPT STUDY PRACTICE IN MATHEMATICS CLASS FROM NORTH AMERICA TO TANZANIAN CONTEXT.

Lakesia L. Dupree*  
University of South Florida

THE NATURE OF THE DISCOURSE BETWEEN PRESERVICE ELEMENTARY TEACHERS AND THEIR MATHEMATICS COACH DURING FIELD EXPERIENCES

Molly Fisher* (1), Edna Schack (2), Jonathan Thomas (1), Cindy Jong (1)  
1: University of Kentucky; 2: Morehead State University

CHANGES IN PRE-SERVICE TEACHERS’ ATTITUDES TOWARD MATHEMATICS: DIFFERENCES IN TRADITIONAL AND ONLINE APPROACHES
Ulrich Kortenkamp, Johanna Goral*, Ingrid Glowinski, Safyah Hassan-Yavuz, Joost Massolt, Jessica Seider, Sandra Woehlecke
Universität Potsdam
IDENTIFICATION OF SPECIFIC LEVELS OF SCHOOL-RELATED CONTENT KNOWLEDGE RELEVANT TO MATHEMATICS PRIMARY TEACHERS

Weerasuk Kanauan*, Wipaporn Suttiamporn, Maitree Inprasitha
Khon Kaen University
MATHEMATICS STUDENT INTERNS’ REFLECTING ABOUT THEIR LEARNING DURING PRACTICUM WITH LESSON STUDY AND OPEN APPROACH

Nicole Koppitz*
University Gießen
MATHEMATICAL ASSISTANCE IN TEACHER EDUCATION

Hege Marie Mandt*
Østfold University College
PRE-SERVICE MATHEMATICS EDUCATION OF PRIMARY TEACHERS IN NORWAY

Yuki Masuda*
Tokyo Seiaku University
ANALYSIS OF ELEMENTARY SCHOOL MATHEMATICS LESSONS TEACHER TRAINING IN DAILY RECORDS

Antonella Montone*, Eleonora Faggiano, Michele Fiorentino, Michele Pertichino
University of Bari Aldo Moro
PRE-SERVICE PRIMARY TEACHERS DEALING WITH FRACTIONS: A SEMIOTIC MEDIATION PERSPECTIVE FOR ADULT LEARNERS

Alisa Moonsri* (1), Maitree Inprasitha (2), Narumon Changsri (3)
1: Doctoral Program in Mathematics Education; 2: Center for Research in Mathematics Education; 3: Center for Research in Mathematics Education
PRE-SERVICE TEACHER’ PERSPECTIVE ON LESSON PLAN

Annabell Ocken*
TU Dortmund
REGISTERS OF COMPETENCES IN PRE-SERVICE EDUCATION OF PRIMARY TEACHERS – USAGE AND ACCEPTANCE

Maria Ricart*, Maria José Gros, Assumpta Estrada
Universitat de Lleida
ANALYSIS OF CONCEPTUAL MAPS FOR THE ASSESSMENT OF PROPORTIONALITY KNOWLEDGE OF FUTURE PRIMARY TEACHERS

Adriana Richit* (1), Marilane Wolff Paim (2), Mauri Luís Tomkelski (3)
MATHEMATICAL EDUCATION OF TEACHER TO LEARNING IN EARLY YEARS OF ELEMENTARY SCHOOL

Peder Rostgaard*, Arne Mogensen
VIA University College
LESSON STUDY AS FRAMEWORK FOR GUIDANCE MEETINGS IN TEACHING PRACTICE
Time: Friday, 29 July 2016, 18.00–19.00 / Location: I: blue, Philosophical Tower, foyer
TSG 48 – Pre-service mathematics education of secondary teachers

Linda Ann Arnold*  
Monmouth University
**USING LESSON STUDY WITH PRE-SERVICE SECONDARY MATHEMATICS TEACHERS IN EARLY FIELD PLACEMENT EXPERIENCES**

Matthias Böckmann*, Stanislaw Schukajlow, Janina Krawitz  
Institut für Didaktik der Mathematik und Informatik
**PRE-SERVICE TEACHERS’ JUDGEMENTS OF STUDENTS’ UNREALISTIC SOLUTIONS**

Matias Camacho-Machín*, (1), Mar Moreno (2), María Candelaria Afonso (1), María Teresa González (3)  
1: University of La Laguna; 2: University of Alicante; 3: University of Salamanca
**TASKS PROBLEM SOLVING WITH DIGITAL TOOLS FOR PRE-SERVICE SECONDARY SCHOOL TEACHERS: WHAT TYPE OF TASKS SHOULD BE USED?**

Patrizia Enenkel*, Jürgen Roth  
University of Koblenz-Landau
**DIAGNOSIS OF GEOMETRIC CONCEPTUALIZATIONS OF STUDENTS**

Viktor Isaev*, Andreas Eichler  
Universität Kassel
**BRIDGING OF MATHEMATICS AT UNIVERSITY LEVEL AND SCHOOL MATHEMATICS IN SECONDARY TEACHER EDUCATION**

Gladis Kersaint*, Ruthmae Sears  
University of South Florida
**PARTNERSHIP TO DESIGN A MIDDLE SCHOOL MATHEMATICS TEACHER PREPARATION PROGRAM WITH EXTENSIVE CLINICAL EXPERIENCES**

Sharon McCrone* (1), Timothy Fukawa-Connelly (2), May Chaar (3)  
1: University of New Hampshire; 2: Temple University; 3: Framingham State University
**SITUATING PRESERVICE TEACHER EDUCATION IN THE WORK OF TEACHING**

Itgel Miyejav* (1), Buyantogtokh Dashnamjil (2)  
1: National University of Mongolia; 2: Mongolian State University of Mongolia
**THE MODEL FOR PROFESSIONAL KNOWLEDGE OF MATHEMATICS TEACHERS OF MONGOLIA**

Anna Barbara Orschulik*, Katrin Vorhölter  
University of Hamburg
**STRENGTHENING COOPERATION WITHIN SCHOOL PRACTIVAL ACTIVITIES AS A WAY TO IMPROVE TEACHER EDUCATION**

Jeongmin Park*  
Cal State University Long Beach
**COMPARISON OF MATHEMATICS CREDENTIAL PROGRAM AND CURRICULUM IN SECONDARY EDUCATION: SOUTH KOREA AND UNITED STATES**

Klaus Rasmussen*  
Metropolitan University College
**CONSECUTIVE CYCLES OF “WHOLE CLASS” LESSON STUDY**
Sigal-Hava Rotem*  
Weizmann Institute of Science  
FACILITATING VIDEO-BASED WORKSHOPS FOR PRE-SERVICE MATHEMATICS TEACHERS: A CASE STUDY

Deborah Tully*, Judy Anderson, Leon Poladian  
University of Sydney  
IMPROVING RETENTION OF PRE-SERVICE TEACHERS THROUGH EXPANDING COMMUNITIES OF PRACTICE

Jeannette Vargas* (1), José Eduardo Novoa (2), Maureen Castañeda (2)  
1: Universidad Colegio Mayor de Cundinamarca; 2: Universidad Pedagógica Nacional  
CHARACTERIZING WITH THE CONTENT DIDACTIC KNOWLEDGE NOTION: CONSTRUCTION OF THE LOGARITHMIC FUNCTION GRAPHIC REPRESENTATI

Moritz Walz*, Jürgen Roth  
University of Koblenz-Landau  
DIAGNOSTIC COMPETENCE AND THE DEVELOPEMENT OF LEARNING ENVIRONMENT

Time: Friday, 29 July 2016, 18.00–19:00 / Location: I: blue, Philosophical Tower, foyer  
TSG 49 – In-service education and professional development of primary mathematics teachers

Sneha Bhansali*, Jihyun Hwang, Kyong Mi Choi  
University of Iowa  
EFFECTS OF A PROFESSIONAL DEVELOPMENT PROGRAM ON CRITICAL THINKING SKILLS OF FIFTH-GRADE STUDENTS

Elke Binner*, Katja Eilerts  
Deutsches Zentrum für Lehrerbildung Mathematik (DZLM)  
PROFESSIONAL QUALIFICATION CONCEPTUALLY COMBINED WITH LESSON DEVELOPMENT

Sebastian Friedl*, Simone Reinhold  
Universität Leipzig  
INTERACTIVE VIDEO-SIMULATION TO TRACE DIAGNOSTIC STRATEGIES OF TEACHERS AND PRE-SERVICE TEACHERS: A PROMISING APPROACH?

Maggie Hackett*  
University of Arizona  
WHAT AND HOW TEACHERS NOTICE IN STUDENTS’ SMALL GROUP INTERACTIONS

Reinhold Haug*  
University of Education  
TOWARDS A GREATER PROFESSIONALISM OF PRIMARY TEACHER AND KINDERGARTEN EDUCATOR USING THE EXAMPLE OF THE MATHELINOPROJECT

Bik Kwan Ip*  
S.T.F.A. Lee Kam Primary School  
MATHEMATICS TEACHERS’ LEARNING CIRCLE IN A HONG KONG PRIMARY SCHOOL
Saastra Laah-On* (1), Sampan Thinwiangthong (1), Maitree Inprasitha (1,2)
1: Faculty of Education; 2: Center for Research in Mathematics Education
EMERGENT OF COGNITIVE DISSONANCE BY ANOTHER TEACHERS’ CLASSROOM VIDEO

Sijia Zhu, Douglas McDougall*, Ying Chen
University of Toronto
RECIproCAL LEARNING BETWEEN CANADIAN AND CHINESE ELEMENTARY MATHEMATICS TEACHERS

Babette Moeller*
Education Development Center
MATH FOR ALL: ESTABLISHING THE EVIDENCE BASE FOR A PROFESSIONAL DEVELOPMENT PROGRAM

Naoki Ohta* (1), Seiji Moriya (2)
1: Fukuyama City University; 2: Tamagawa University
CREATION OF EDUCATIONAL CONTENT FOR DEVELOPING A LESSON STUDY

Jennie Pennant*
GrowLearning
COACHING: WHAT DO PRIMARY TEACHERS PERCEIVE AS THE EFFECTIVE ELEMENTS OF A SPECIALIST-COACHING APPROACH IN MATHEMATICS?

Chloe Weir*
University of Western Ontario
ELEMENTARY MATHEMATICS TEACHERS AND SELF-DIRECTED PROFESSIONAL DEVELOPMENT

Amber Willis*
University of Michigan
SITUATING TEACHERS’ OPPORTUNITIES TO LEARN IN PRACTICE-BASED PROFESSIONAL DEVELOPMENT

Stephanie Schuler, Gerald Wittmann*
University of Education Freiburg
PRIMARY SCHOOL TEACHERS RUNNING IN-SERVICE TRAININGS FOR FELLOW TEACHERS – AN INVESTIGATION OF ACTIVITIES AND EXPECTATIO

Time: Friday, 29 July 2016, 18.00–19:00 / Location: I: blue, Philosophical Tower, foyer
TSG 50 – In-service education, and professional development of secondary mathematics teachers

Jehad Alshwaikh*
University of the Witwatersrand
MDI AND CHANGING PRACTICE IN MATHEMATICS INSTRUCTION

Samuel Bengmark* (1), Linda Mattsson (2)
1: Chalmers University of Technology; 2: Blekinge Institute of Technology
WHAT MATHEMATICS TEACHERS MISS IN THEIR IN-SERVICE TRAINING

Nathan Borchelt*
Western Carolina University
MATH TEACHERS’ CIRCLES: BUILDING COMMUNITIES OF MATHEMATICAL PRACTICE
Dédé L. de Haan*  
Utrecht University  
THE EFFECTIVENESS OF PROFESSIONAL DEVELOPMENT FOR MATH TEACHERS: COMPARING TWO PROFESSIONAL DEVELOPMENT INTERVENTIONS

Paulo Diniz* (1), Jonei Cerqueira Barbosa (2)  
1: Universidade Pedagógica de Moçambique; 2: Universidade Federal da Bahia  
RECONTEXTUALIZING EDUCATIVE CURRICULUM MATERIALS BY MATHEMATICS TEACHERS IN MOZAMBIQUE

Hanna Gärtner*, Matthias Ludwig  
Goethe-University of Frankfurt  
EVALUATION OF AN INQUIRY, DISCOVERY AND PROJECT-BASED LEARNING PROGRAM

Lizeka Gcasamba*  
University of Witwatersrand  
INVESTIGATING MATHEMATICS TEACHER LEARNING WHEN USING A RESEARCH-DESIGNED RESOURCE IN A LESSONING STUDY

Jennie Golding*  
University College London Institute of Education  
TEACHER OCCUPATIONAL CAPACITY: WHAT IT IS AND WHY IT MATTERS

Rita Santos Guimaraes*  
University of Nottingham  
CHANGES IN PRACTICE: TEACHERS IN A DISCUSSION GROUP ABOUT LOW ACHIEVING STUDENTS

Tobias Jaschke*, Christine Bescherer  
Pädagogische Hochschule Ludwigsburg  
HOW TO INITIATE MATHEMATICAL UNDERSTANDING – DEVELOPPING A TEACHER TRAINING ON THE CONSTRUCTION OF SUITABLE PROBLEMS

Steffen Lünne*  
DZLM  
OUT-OF-FIELD TEACHERS’ LESSON-PLANNING IN MATHEMATICS AFTER EDUCATION

Nontsikelelo Luxomo*  
University of the Witwatersrand  
WHAT IS AN EXPLANATION AND ACTS OF EXPLAINING IN ALGEBRA?

Wairimu Macharia*  
CEMASTEA  
A POSTER ON PEDAGOGICAL SHIFT FROM PRE-ASEI CONDITION TO ASEI CONDITION

Behailu Mammo* (1), Jacqueline Brooks (2)  
1: Hofstra University; 2: Stony Brook University  
A WINDOW INTO NEW TEACHERS’ MINDS

Narges Mortazi Mehrabani*  
Shahid Beheshti University  
DEVELOPING A MODEL FOR MATHEMATICS TEACHERS’ PROFESSIONAL LEARNING FROM EACH OTHER
Yael Nurick*  
Weizmann Institute of Science  
THE ROLE OF VIDEOTAPE MATHEMATICS LESSONS IN THE CRYSTALLIZATION OF TEACHERS’ MATHEMATICAL KNOWLEDGE FOR TEACHING

Arnulfo Perez*, Anthony Myers, Azin Sanjari, Bailey Braaten  
The Ohio State University  
UNDERSTANDING ALGEBRA TEACHERS’ COMPUTATIONAL THINKING

Adriana Richit* (1), Andriceli Richit (2), Mauri Luis Tomkelski (3)  
TEACHERS’ PROFESSIONAL DEVELOPMENT FROM THE POINT OF VIEW LESSON STUDIES

Natalie Ross* (1), Gabriele Kaiser (2), Johannes König (2), Sigrid Blömeke (3), Nils Buchholtz (1), Andreas Busse (1)  
1: University of Hamburg; 2: University of Cologne; 3: CEMO of University of Oslo  
TEDS-VALIDATION – VALIDATION OF INSTRUMENTS MEASURING PROFESSIONAL COMPETENCE OF MATHEMATICS TEACHERS

Leonard Sanchez*  
Paris Diderot University  
DIDACTIC ENGINEERING OF TEACHERS TRAINING IN DYNAMIC GEOMETRY

Victoria Shure*  
Freie Universität Berlin  
SUBJECTIVE THEORIES OF IN-SERVICE MATHEMATICS TEACHERS TOWARDS GERMAN AS A SECOND LANGUAGE IN MATH INSTRUCTION

Tom Coenen, Mark Timmer*, Nelle Verhoeof  
University of Twente  
DUTCH LESSON STUDY – EXAMPLES OF TEACHER LEARNING

Oliver Wagener*, Larissa Zwetzschler  
Universität Duisburg-Essen  
“TYPES OF KNOWLEDGE” IN PROFESSIONAL-DEVELOPMENT COURSES ON TWO LEVELS: TEACHERS & FACILITATORS

Juei Hsin Wang*, Yen Ting Chen  
National Chiayi University  
A CASE STUDY OF MATH TEACHERS’ TPACK PROFESSIONAL DEVELOPMENT ON FLIPPED EDUCATION

Diana White*  
University of Colorado Denver  
MATH TEACHERS’ CIRCLES: SUMMARIZING FIVE YEARS OF RESEARCH RESULTS

Sun A Yang*  
KNUE  
SECONDARY MATHEMATICS TEACHERS’ PERCEPTION AND ADVANCED MATHEMATICAL KNOWLEDGE FOR TEACHING OF ALGEBRA

Zhang Yue*  
Capital Normal University  
A STUDY TO MATHEMATICS TEACHER TEAM OF JUNIOR SECONDARY SCHOOL
Wahid Yunianto*, Subanar Subanar
SEAMEO Regional Center for QITEP in Mathematics
CONTINUOUS PROFESSIONAL DEVELOPMENT PROGRAM: MATHEMATICS TEACHING AND LEARNING MODELS

Maria Teresa Zampieri* (1), Sueli Liberatti Javaroni (2)
1: UNESP; 2: UNESP
CHANGES IN EDUCATIONAL PRACTICES OF MATH TEACHERS: APPROACHES WITH GEOGEBRA

**Time: Friday, 29 July 2016, 18.00–19:00 / Location: I: blue, Philosophical Tower, foyer**
TSG 52 – Empirical methods and methodologies

Tatiana Peres Toledo*
University of Ottawa
“HIC ET NUNC” IN ENACTIVISM AND PHENOMENOLOGY: THE VALUE OF NOTICING

Robert Ronau* (1), Chris Rakes (2), Sarah Bush (3)
1: University of Cincinnati; 2: University of Baltimore County; 3: Bellarmine University
MATHEMATICS EDUCATION RESEARCH QUALITY RESULTS APPLIED TO PROFESSIONAL DEVELOPMENT EVALUATION AND RESEARCH FRAMEWORKS

Karsten Schmidt*
Hochschule Schmalkalden
TEACHING MATHEMATICS AND STATISTICS IN THE PC LAB – WHAT DO THE STUDENTS THINK?

Marcos Silva*
Federal University of Maranhão – Brazil
THE STATISTICAL AND STRATEGIC PLANNING AS AID INSTRUMENTS FOR IMPROVING MATHEMATICS TEACHING AND LEARNING

Alessandro Spagnuolo*, Elena Lazzari
University of Ferrara
AN ANALYSIS OF PEER EDUCATION INTERVENTIONS IN MATHEMATICS EDUCATION

Dirk Wessels*
Stellenbosch University
THERE IS NOTHING SO PRACTICAL AS A GOOD THEORY: DESIGN-RESEARCH IN MODELLING

**Time: Tuesday, 26 July 2016, 18.00–19:00 / Location: I: blue, Philosophical Tower, foyer**
TSG 53 – Philosophy of mathematics education

Taís Alves Moreira Barbariz*
UNESP
GEOMETRY: OF WHAT IT TREATS?
Peter Collignon*
University of Erfurt
TEACHING APPLIED MATHEMATICS AS A BRIDGE FROM PHILOSOPHY OF SCIENCE TO PHILOSOPHY OF MATHEMATICS EDUCATION

Fayez Mourad Mina*
Ain – Shams University
COMPLEXITY AND MATHEMATICS EDUCATION

Samuel Otten (1), Ryan Nivens* (2)
1: University of Missouri; 2: East Tennessee State University
COMPARING JOURNAL IMPACT MEASURES IN MATHEMATICS EDUCATION

Marli Regina Santos* (1), Rosemeire de Fatima Batistela (2)
1: Universidade Federal de Viçosa;
2: UEFS – Universidade Estadual de Feira de Santana e UNESP – Rio Claro
ASPECTS OF INSIGHTS ABOUT ANGLE GIVEN IN THE INTERSUBJECTIVES RELATIONS

Anderson Afonso Silva*, Maria Aparecida Viggiani Bicudo
Universidade Estadual Paulista – UNESP
THE PRODUCTION OF KNOWLEDGE IN MATHEMATICS EDUCATION RESEARCH GROUPS IN BRAZIL
Discussion Groups

MATHEMATICS CLASSROOM TEACHING RESEARCH FOR ALL STUDENTS

Discussion Group

Time: Tuesday, 26 July 2016 and Friday, 29 July 2016, 16.30–18.00
Location: I: blue, Philosophical Tower, lecture hall B
Organising team: Shuhua An* (California State University), Steklács János, Zhonghe Wu

Abstract: The CTRAS Discussion Group demonstrates classroom teaching research for all students (CTRAS), through scientific research studies that also are applicable and make sense for classroom teachers. This Discussion Group will be structured by starting with a dialogue on the framework of classroom teaching research followed by discussions of each study by scholars and classroom teachers. The new research questions and action plans will be developed from the sessions of the CTRAS Discussion Group, and various working groups will be formed based on the different areas of focus in classroom teaching research.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.

MATHEMATICAL DISCOURSE IN INSTRUCTION IN LARGE CLASSES

Discussion Group

Time: Tuesday, 26 July 2016 and Friday, 29 July 2016, 16.30–18.00
Location: C: turquoise, Main Building, lecture hall M
Organising team: Mike Askew* (1,6), Ravi Subramaniam* (2), Anjum Halai (3), Erlina Ronda (4), Steve Lerman (5), Jill Adler (1), Hamsa Venkat (1)
(1: University of the Witwatersrand; 2: Homi Bhabha Centre for Science Education; 3: The Aga Khan University; 4: University of the Philippines; 5: London South Bank University; 6: Monash University)

Abstract: This DG is for participants interested in issues and challenges related to mathematics education in schooling systems where large classes (40+ students) are the norm. The fact that being in a large class is the reality for many students, particularly in developing nations, leads the organisers of this discussion group to consider the study of teaching large classes, at both primary and secondary levels, to be a worthy object of research and inquiry. In such it is primarily the teachers’ instructional practices that provide the main point of access to mathematics for the learners. This DG team have been working with an analytical framework for studying mathematical discourse in instruction, MDI, which is characterised by four interacting components in the teaching of a mathematics lesson: exemplification, explanatory talk, learner participation and the object of learning (goal). Anticipated aims include identifying, sharing and discussing common key issues in teaching and learning in large classes and exploring the potential of the MDI framework to examine such issues. Thus we aim both to broaden the base of lessons that the framework might be applied to and to explore developing MDI.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.
MATHEMATICS TEACHER NOTICING: EXPANDING THE TERRAINS OF THIS HIDDEN SKILL OF TEACHING

Abstract: Research on what and how mathematics teachers notice in the classrooms has gathered momentum in the last decade, with an emphasis to develop noticing expertise in mathematics teachers. This DG aims to explore and expand the terrains of research on teacher noticing in 3 aspects: conceptualizations of noticing, methodologies for studying noticing, and the study of noticing in different contexts. Three sets of key questions will frame the discussions:

Question Set 1: What conceptualizations of noticing have been used? How do these inform our understanding of the processes of noticing? How are these conceptualizations related? Are there other new ways of conceptualizing noticing? Is it possible to assess teacher noticing expertise, and if so, how?

Question Set 2: What methodologies have been used for studying noticing? What other ways of studying noticing can we consider? How do we capture the different processes of noticing? How do we document the growth in a teacher’s noticing expertise?

Question Set 3: What are the different contexts in which the study of noticing can be situated? How context specific is noticing? What is the relationship between teacher noticing and student learning?

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.

CONNECTIONS BETWEEN VALUING AND VALUES: EXPLORING EXPERIENCES AND RETHINKING DATA GENERATING METHODS

Abstract: What do teacher colleagues learn when they read our research? What would teacher colleagues find if they looked at some of our research in a different way? Do our teacher friends wonder what it might be like to teach values that they are not sure of? Do our research colleagues wonder whether role play could be a set of new methods we could use in the future that might help in this area? One possibility for teachers we think is using role-playing as a way of building new experiences and for researchers as a potentially different type of data-generating context. Hence in this Discussion Group we explore values and valuing, and then perform and evaluate a role-play to this end. At the core of this context is experiencing what it is like to act out a given valuing role, or observing players who do so, and ascertaining whether identifiable behaviours are more likely to be associated with specific values. We will explore the experiences of the different ‘players’ and wonder whether such an approach will be useful for both teachers and researchers in coming to understand more deeply what it feels like to experience valuing a given value, and deciphering what behaviours point to particular values.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.
DEVELOPING NEW MATHEMATICS TEACHER LEARNING IN SCHOOLS AND THE STEM AGENDA

Abstract: The juxtaposition of school centred teacher preparation with shortages of well-qualified mathematics and science teachers at primary and secondary level in our countries raises big questions. The main purpose of this Discussion Group is to draw together international perspectives in exploring what can be learned about successful teaching and learning of mathematics-related fields by teachers, beginner teachers and teachers seemingly teaching ‘out of field’; and to consider challenges for practice. The intention is to find ways of supporting the preparation of teachers in schools where reality is that expertise may be thin on the ground. We draw upon stimulus material from tertiary education and from informal learning, and this experience comes from practice, from policy, from research and from scholarship.

Outcomes include a sense of direction in the reality of preparing new mathematics teachers through school-centred approaches; international networks that sustain and lead to collaborative intervention projects; ways for mathematics teacher educators to position their work alongside policy and practice in schools.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.

NATIONAL & INTERNATIONAL INVESTMENT STRATEGIES FOR MATHEMATICS EDUCATION

Abstract: Mathematics education is an essential pathway for economic security and technological advancement at the national, community, and individual levels. There is world-wide impetus for innovation and improvement of mathematics curriculum and pedagogical practices that meet local and practical needs. Input from practitioners is essential for policy makers and research funding organizations to navigate the path forward. The 13th International Congress on Mathematics Education is an excellent venue to engage educators with national and regional policymakers. This discussion group will explore the following global issue:

What is the appropriate role of funding agencies, ministries, and related institutions in influencing and advancing improvements in mathematics education research and policy, as well as in facilitating international research in mathematics learning?

Questions will include: How should organizations set priorities for mathematics education research and policy that connect to local and practical needs? How can scientific communities contribute to processes of strategic planning and agenda setting in funding agencies? What kind of international collaborations might be useful?

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.
Discussion Groups

**TRANSITION FROM SECONDARY TO TERTIARY EDUCATION**

Abstract: The modern world thrives on quantitative information. Consequently, many university majors are becoming increasingly mathematical. Thus it is problematic that many secondary school graduates are not ready for tertiary course work in mathematics and statistics. For example, 35.1% of U.S. college mathematics enrollments are in pre-college remedial courses: 1.4 million out of 3.9 million in fall 2010 (Blair, Kirkman, & Maxwell, 2012). Such deficiency in mathematical knowledge and skills can influence students’ decisions to abandon their intended major and transfer to a less mathematically demanding major, or even to quit tertiary education. This discussion group will examine the difficulties that students encounter in making the mathematical transition from secondary to tertiary education. The group will investigate the methods used to assess student readiness in mathematics and programs to help beginning tertiary students when they face mathematical struggles. The discussion will consider both students who seek mathematicially intensive majors at the tertiary level and those who pursue less mathematically intensive degrees.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.

**TEACHERS TEACHING WITH TECHNOLOGY**

Abstract: The two sessions of the T3-discussion group cover the main aspects of the work of T3 Europe, particularly in Germany. Each session will be organized along two subtopics beginning with a brief input (max. 10 min) about a concrete example – followed by a statement from the discussant to open a plenary discussion afterwards.

Details of the discussion group and the timetable can be found in the programme at the website and in Conftool.

**INTERNATIONAL MATHEMATICAL MODELING CHALLENGE (IMMC)**

Abstract: Through student presentations and a panel discussion with members of the Organizing Committee we will present the new International Mathematical Modeling Challenge, a high school modeling competition with world-wide representation. Only in its second year the challenge has representatives of 30 countries. We welcome your participation.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.
MATHEMATICS EDUCATION AND NEUROSCIENCE

Abstract: The research field of educational neuroscience – linking neuroscience, psychology, and education – has witnessed a tremendous growth in the past 5–10 years. By combining behavioral and neuroscientific methods, its general aim is to achieve a broader understanding of the neurocognitive mechanisms underlying learning and to support the development of effective instruction. A considerable impetus for the growth of educational neuroscience came from research on mathematics learning. Some of these findings have been presented in special issues in the journal ZDM Mathematics Education, in 2010 and 2016. Despite the field’s success, it has been repeatedly questioned whether the obtained neuroscientific evidence has implications for education or whether the connection between neuroscience and education is a bridge too far. Has the inclusion of the neuroscientific level of analysis furthered our understanding of mathematics learning and how to support it? The aim of this discussion group is to bring together neuroscientists, psychologists, and math educators, and to discuss the chances and limitations of educational neuroscience research on selected topics of mathematics education.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.

WHAT MATHEMATICS EDUCATION WILL PREPARE STUDENTS FOR THE SOCIETY OF THE FUTURE?

Abstract: In this Discussion Group we want to gather congress participants interested in exchanging and discussing potential answers to the question, “What are the implications of the computerization and globalization of our society for mathematics education?” The role of mathematics in our society is growing, but more importantly, mathematics is increasingly done by machines. This will have an impact on both future job requirements and on the mathematics one will need to understand their world. So the question arises, “How can mathematics education prepare students for being able to participate in the digital society?”

Key Questions are:
Which of the 21st century skills can, and should, be fostered in mathematics education? And, how could this be done?
What skills and insights are necessary for mathematical modeling in out-of-school reality? And, what are the implications for mathematics education?
What mathematical topics will have to be designated as goals of mathematics education?
How will a shift in goals from routine skills to understanding affect the learning trajectories and the overall structure of the curriculum? And, how can computer tools help reaching those goals?

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.
CHALLENGES IN TEACHING PRAXIS WHEN CAS IS USED IN UPPER SECONDARY MATHEMATICS

Abstract: Being unequivocally mathematical and having transformative impact on mathematics itself characterize CAS. This prompts a new dialectic relationship between tool and discipline to be instigated. We address this from the angle of teaching, i.e. CAS focus on mathematical didactics within the frame that CAS is an augmentation of mathematics, and from the angle of professionalization, i.e. teachers operating within the transformed conditions. CAS has been an important means to meet the systemic call for targeting the teaching of mathematics at giving a large number of students authentic skills, while still being an instrument for sorting students to different higher educational levels. Which challenges do teachers face within the educational system? Teachers are often caught in a choice between sound use of CAS in mathematical thinking and merely letting CAS serve as a tool to surpass cumbersome problem solving. How can we support teachers to be robust operators? What standards should a communal language of a didactical discourse possess, and what experience is there to support teachers in obtaining these skills and aid them in developing their own teaching in order to meet these demands?

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.

MATHEMATICS IN CONTEMPORARY ART AND DESIGN AS A TOOL FOR MATH-EDUCATION IN SCHOOL

Abstract: Aim No. I – (Tuesday) :Mathematics in contemporary art with special view on roots in countries of origin of refugees actually entering Europe. The idea is to give indigenous children (and adults) as well as immigrated children (and adults) by the way an idea of the cultural level in their formerly homelands and some proudness, too.
Aims No. II – (Friday) First: Contemporary art and design often is real applied mathematics and it is more interesting to scholars than traditional math teaching.
Secondary: The velocity of the internet allows artists to pick up new results nearly simultaneously to the specialists and introduce them into their artpieces.
Examples, Lectures, Handouts: Participants of DG are asked to search for examples (aim I or aims II). If possible send them in advance to guderian@ph-freiburg.de to find out together, which examples might be effective for a short lecture during the sessions. Resting examples may be introduced by handouts to the DG, too. There are three exhibitions in Hamburg galleries (Kammers, Multiple-Box, Preussners) specially curated for the DG. During ICMI every day information on their events via: www.dietmarguderian.de

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.
**A FRAMEWORK FOR MATHEMATICS TEACHER EDUCATION: LINKING TEACHER PERSPECTIVES TO MATHEMATICS TEACHING COURSES**

**Abstract:** The focus of the Discussion Group will be two-fold: first day, the discussion will be centered on introducing and discussing mathematics teacher’s perspectives. For that, we plan to discuss and define each of the perspectives on teaching. Then, we plan to discuss knowledge quartet framework and how perspectives framework differ from other notions in the field such as beliefs, dispositions, etc. Finally, we plan to discuss how perspectives framework may assist mathematics teacher educators and how it could be studied with the account of practice methodology. The second day, the discussion will focus on fostering teachers’ Advances along the perspective continuum. For that, we plan to discuss how quantitative reasoning framework might contribute to math teacher education and what research has been done in turkey to foster progress toward the progressive incorporation perspective (pip): in particular, we plan to discuss the I) quantitative reasoning II) tasks focusing on logico-mathematical and empirical learning processes, III) conceptual analysis, and IV) clinical interviewing as a possible four-column base framework for the development of pip in the methods and practice teaching courses.

**Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.**

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**THEORETICAL FRAMEWORKS AND WAYS OF ASSESSMENT OF TEACHERS’ PROFESSIONAL COMPETENCIES**

**Abstract:** The Discussion Group brings together major projects on mathematics teachers’ professional competencies and thus forwards the exchange of research teams’ approaches and new findings brought about by their current research activities. The discussion group, covering two sessions of 90 minutes each, shall be a mix of discussions on general and topical questions related to theoretical frameworks and ways of assessment of teachers’ professional competencies. Both sessions are moderated jointly by the organisers. In all discussions, the audience is invited to participate. In the first session, after an introduction by the organisers, the first three projects are characterised by the strong focus on teachers’ knowledge facets. After the fourth project, which makes the transition to an enriched framework on teachers’ competencies including performance-oriented competence facets being evaluated via video, the discussant Hilda Borko will comment in a summarising way on the four projects. The second session will be devoted to projects with a focus on situated competence facets, which are evaluated via video-based assessment instruments.

**Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.**
**Discussion Groups**

**USING REPRESENTATIONS OF PRACTICE FOR TEACHER EDUCATION AND RESEARCH – OPPORTUNITIES AND CHALLENGES**

**Abstract:** Representations of classroom practice offer the chance of referring to the teachers’ professional environment both when conceiving opportunities of professional development and when investigating aspects of teacher expertise. Representations of practice can stimulate teachers’ criteria-based analysis in environments that do not bring the full pressure and action constraints of the actual classroom. This discussion group aims at collecting experiences with different forms of use of representations of practice in pre-service and in-service teacher professional development activities and research into aspects of teacher expertise and its development. On this base, the discussion group plans to include an overview of different approaches to representing practice, address key issues of case-based learning, as well as methodological issues and questions related to validity of the construct(s) researchers or facilitators aim to address.

**Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.**

**MATHEMATICS ROLE AT SCHOOL IN POST-CONFLICT ENVIRONMENT.**

**Abstract:** The Colombia armed conflict is presented as well as state policies that have been configured to think the school’s structure during post-conflict. Similar experiences of countries that have already gone through or are in post-conflict situation, by contributions and accounts of participants in the discussion are evaluated to see how the armed conflict in a country reassesses the curriculum of mathematics, especially when mathematics becomes a factor of desertion and discouragement at all school levels. The main features which should concentrate education policies after the resolution of the conflict arises, considering that education is seen as a stage that helps to legitimize new inclusion practices and enhance opportunities for dialogue and knowledge building. Finally the construction of minutes compiling all contributions by those attending the discussion group is performed through analysis named above, leading by three generating questions. Finally, the creation of a network to allow continuous study on issues related to the reevaluation of the school mathematics curriculum in a post-conflict environment and how work is set speech math teacher must adapt to these new demands.

**Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.**
VIDEOS IN TEACHER PROFESSIONAL DEVELOPMENT

Abstract: Over the last decade or so, the leap in video-related technology (that afforded ease of capturing, storing, editing, and transmitting of video data) has prompted a re-visit to the promise of video in teacher education. They allow teachers not only to learn through modeling and feedback, but technologically they better enable inquiry-based approaches. There is, however, as yet a lack of discussion at the theory level in the literature on a number of critical issues in this field. Without clear theoretical orientations, efforts to implement – even successfully – video usage in teacher PD remain as isolated cases without a broader framework to guide replicable and future work in this area. Thus, the aim of this Discussion Group (DG) is to propose and discuss models of video-based PD programmes that are strongly grounded theoretically.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.

DIAGNOSTIC COMPETENCES OF MATHEMATICS TEACHERS

Abstract: Teachers’ diagnostic activities consist of gathering and interpreting data, be it by formal testing, by observation, by evaluating students’ writings or by interviewing students. In teaching, the goal of diagnosis is to yield valid knowledge on the achievement of individual students or of the whole class. The teachers’ knowledge, skills and beliefs connected to these diagnostic activities can be summarized as diagnostic competences. Only very few efforts try to elucidate the cognitive processes activated. Nickerson (1999) presents a general model based on a huge body of research on people’s understanding of the knowledge of others and on processes of imputing other people’s knowledge. The discussion group focuses on mathematics teachers (pre-service / in-service) and their competences and practice in diagnostic situations. The topics addressed during the sessions elaborate on theoretical foundations, significant findings, different empirical approaches and on analysis or support of teachers’ practice.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.

APPLYING CONTEMPORARY PHILOSOPHY IN MATHEMATICS AND STATISTICS EDUCATION: THE PERSPECTIVE OF INFERENTIALISM

Abstract: The aim of this discussion group is to put contemporary philosophy to work (cf. Cobb, 2007). Inferentialism is an example of contemporary philosophy (Brandom, 2000) that increasingly receives interest in mathematics and statistics education. It can be considered an orienting framework that provides ontological and epistemological foundations for conceptualizing and analyzing knowledge, learning, communication, and reasoning in the fields of mathematics and statistics. Inferentialism avoids a representationalist perspective on knowledge and learning by focusing on reasoning and inferences (Bakker & Derry, 2011). The Discussion...
Group addresses researchers who are interested in the role and use of inferentialism or other contemporary philosophies in mathematics and statistics education. It gives the attendants the opportunity to share perspectives, to question, to discuss, and to make joint efforts in answering the posed key issues. The DG format at ICME provides the opportunity to discuss the significance and the restrictions of the perspective of inferentialism and other contemporary philosophies on the

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.

**Using a Graph Theory Problem to Promote Problem Solving in Professional Development of Secondary Teachers**

Abstract: The session involves the presentation of a graph theory problem used in professional development settings promoting problem solving. A graph theory problem was chosen as this topic is not a standard topic for secondary classes. Most secondary teachers have had limited exposure to the topic and therefore will be solving a new problem. Participants will be given time to work the problem and discuss their solutions. This discussion will be followed by a discussion of ways to improve the professional development experience and possible other problems that could be used in this environment.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.


Abstract: Students are changing faster than classroom adaptation. The 21st century classroom challenges teachers that routine, rule-based knowledge, which is easiest to test, is also easiest to digitize automate and outsource; thus expecting math teachers to bring in creativity, problem solving and critical thinking in the classroom (Schleider, 2012). But what is this really to a teacher? Do math teachers really understand 21st century classroom and learning? Quality learning comes from quality teaching; and investing in teacher’s professional capital yields good results (Hargreaves&Fullan, 2012). Thus, how can we develop teacher’s professional capital? This workshop will share teacher professional development practices in JP, Phil, SG and USA, and provide participants a venue to learn about, raise questions and reflect on their own teacher education/professional development practices. The workshop’s key ideas are (1) discussing the content, pedagogical and cultural expectations and its gap with current classroom practices, and (2) the possibility of constructing a universal framework for math teacher education preparation/professional development practices for the 21st century math classroom.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.
Time: Tuesday, 26 July 2016 and Friday, 29 July 2016, 16.30–18.00
Location: G: green, Social Science Building, room 28
Organising team: Dragana Martinovic* (1), Viktor Freiman* (2)
(1: University of Windsor; 2: Moncton University)
HOW DOES MATHEMATICS EDUCATION EVOLVE IN THE DIGITAL ERA? DISCUSSING A VISION FOR MATHEMATICS EDUCATION

Abstract: With this discussion group we hope to create synergies and produce ideas on how to improve mathematics education. The general questions may be: Is how we are teaching mathematics in school good enough? Is the kind of mathematics students are learning in schools the right kind? What is the mathematical literacy for the 21st century? How are mathematical and digital literacies connected? Specific topics cover different areas that participants proposed as crucial aspects of mathematical literacy, for example: Financial literacy is needed in life, but what does it entail? What topics are not now being emphasized and what topics now taught will become obsolete? How are the new technologies changing WHAT and HOW we teach and learn? Do they make obsolete the need for traditional manipulative skills? Do they create new opportunities for deeper understanding and problem-solving skills? Is the ability to problem solve necessary when we have devices that help us do things and that connect us with others who know better (or who may have answers)? Are mathematics educators ready to be challenged by the large-scale computing, big data, stochastic modelling, and crowd sourcing?

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.

Time: Tuesday, 26 July 2016 and Friday, 29 July 2016, 16.30–18.00
Location: D: yellow, West Wing Building, room 121
Organising team: Lynne McClure*, Rachael Horsman, Ellen Jameson
(University of Cambridge)
EXPLORING THE DEVELOPMENT OF A MATHEMATICS CURRICULUM FRAMEWORK: CAMBRIDGE MATHEMATICS

Abstract: Cambridge Mathematics is developing an innovative framework for presenting and organising the domain of mathematics that we hope will be able to lend valuable and coherent support to curriculum development efforts in jurisdictions across the world. After much consultation, investigation and research we are developing a map of the full domain of mathematical knowledge from pre-school to the end of upper secondary starting with the experiences pupils should have in mathematics. The work is being influenced by the work of Lynn Arthur Steen and principles of experiential learning and the circular curriculum. Content is being assessed for its appropriateness in a modern society, with considerations for technology integration. All decisions are being carefully based in academic research and practical experiences of teachers. We are now considering ways of representing the domain, tagging and linking various routes and deciding what information such a structure should contain for different audiences. We will share and discuss the Framework project, with a focus on the first draft and current explorations, so that our work can benefit from the range of international expertise present.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.
Time: Tuesday, 26 July 2016 and Friday, 29 July 2016, 16.30–18.00
Location: C: turquoise, Main Building, lecture hall J
Organising team: Raimundo Olfos* (1), Ivan Vysotkiy* (2), Manuel Santos-Trigo* (3), Masami Isoda* (4), Anita Rampal* (5)
(1: Pontificia Universidad Catolica de Valparaiso; 2: Moscow Center for Continuous Mathematical Education; 3: Centro de Investigación y de Estudios Avanzados, Cinvestav-IPN; 4: Centre for research on International Cooperation in Education U. Tsukuba; 5: Un)

SCOPE OF STANDARDIZED TESTS

Abstract: The aim of the Discussion Group is to capture the sense of the community, not only from experts about standardized testing. Reflection should provide implications to global policies. A regular view is “Standardized tests are needed because they can provide an amount of information and evidence of validity. Of course there can be incorrect interpretations, but these can be reduced if the quality of the test has the attributes that are associated with standardized assessments” A critical approach is to highlight “Limited Scope of standardized tests in school maths, because these tests undermine abilities to conjecture and to encourage open problems in class. Standardized testing devalues abilities to collaborate and to engage in real-world experience; failing to the mission of the pursuit of happiness and justice of all. Ethic issues are unsolved: policymakers do not know how to use test-based incentives. Some school systems are under great pressure to raise their scores. Tests create competition between schools. Standardized testing does not take into account diversity, test anxiety, language of students, and special needs. So they fail to the aims of math education”

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.

Time: Tuesday, 26 July 2016 and Friday, 29 July 2016, 16.30–18.00
Location: E: mint, Economical Building, room 0079
Organising team: Susan Orme* (1), Danae Romrell* (2), Elaine Wagner* (3)
(1: Brigham Young University-Idaho; 2: Brigham Young University-Idaho; 3: Brigham Young University-Idaho)

ENGAGING STUDENTS IN ACTIVITIES THAT LEAD TO DEEP STUDENT LEARNING AT THE SECONDARY AND TERTIARY LEVEL

Abstract: “When students connect mathematical ideas, their understanding is deeper and more lasting, and they come to view mathematics as a coherent whole” (NCTM, n.d.). We propose this deeper learning can occur through teaching methods that use carefully designed activities, questions, and assessments.

Well-designed activities occur when students engage with content before, during, and after class. We begin by discussing activities and questions students can engage in to begin developing an understanding of the concepts prior to coming to class. Then, we discuss activities and teaching methods that build on preparatory activities and can be used in class to lead to a richer understanding of mathematical concepts. Finally, we discuss assignments, activities, and assessments that occur after class to help students solidify and demonstrate their understanding.

As noted by the NCTM (n.d.), “students require frequent opportunities to formulate, grapple with, and solve complex problems that involve a significant amount of effort”. The purpose of this discussion group, will be for participants to share activities that have worked well for promoting deeper understanding.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.
LESSON/LEARNING STUDIES (LS) AND MATH EDUCATION

Abstract: Lesson Study (Shimizu, 2014) and Learning Study (Runesson, 2014) (LS) have a growing importance in teacher education, mostly in continuous professional development, but also in prospective teachers' education. LS are conducted in a variety of subjects, often with a non-subject specific point of view. Nevertheless, many LS are conducted in mathematics and are a specific subject of study for many researchers in mathematics education. This interest is paralleled by a demand of more solid theorization of the lesson study process (for eg. Clivaz, 2015; Hart, Alston, & Murata, 2011a; Miyakawa & Winsløw, 2009; Winsløw, 2011). Many social, cultural, cognitive and affective issues have reflexes in the way LS develop and on their results (Ponte et al., 2014). This DG will provide participants with an occasion to discuss the specificities of mathematics LS with regards to regional/national particularities, as well as the methodological and theoretical tools which may be used to carry out research on LS (it's forms, contents, effects etc.) from an international perspective.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.

MATHEMATICS HOUSES AND THEIR IMPACT ON MATHEMATICS EDUCATION

Abstract: Since 1999, teams of the Iranian high school teachers and university faculties have established what are called Mathematics Houses in Iran. “Math House” is a community center that aims to provide a learning environment and opportunities for the students and teachers at all levels for experiencing deeper understanding of mathematical concepts and developing creativity through working on real-life problems by team work and cooperation [1]. House of Mathematics has also been established in other places such as Maison des Mathématiques et de l’Informatique de Lyon (France), La Maison des Maths in Quaregnon (Belgium), Mathematicum in Giessen (Germany), the Arhimedes Premises in Belgrade (Serbia), and possibly in some other places as well, which can be introduced. Introducing Mathematics Houses and similar institutions throughout the world to the audience and discussing their effect on mathematics education and their important impact on promoting team working and popularizing mathematics, as well as looking for some new ways of cooperation and exchange of experiences are the main aims of this Discussion Group.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.
REFLECTING UPON DIFFERENT PERSPECTIVES ON SPECIALIZED ADVANCED MATHEMATICAL KNOWLEDGE FOR TEACHING

Abstract: Teachers’ knowledge assumes a major role in practice and in the students learning and achievement. In particular, the construct of horizon knowledge or, what can be termed specialized advanced mathematical knowledge for teaching (in order to capture the overall perspectives we are dealing with within this proposal) has been the focus of attention from some researchers with different foci of attack (e.g., Carrillo, Climent, Contreras, & Muñoz-Catalán, 2013; Jakobsen, Thames, Ribeiro, & Delaney, 2012; Wasserman & Stockton, 2013; Zazkis & Mamolo, 2011). In that sense, and aiming to deepen our understanding of such a construct, the aim of this working group is to discuss and reflect upon, different theoretical perspectives, methodological approaches and analytic methods used when focusing on such specialized advanced mathematical knowledge for teaching. In particular, we consider the activities of analysing and conceptualizing situations where access and development of such teachers’ knowledge is of primary importance.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.

EVIDENCE-BASED CPD: THE GERMAN CENTER OF MATHEMATICS TEACHER EDUCATION (DZLM)

Abstract: Conceptualizing and developing CPD in an evidence-based way, meaning that strengths of differ approaches to CPD are evidenced by empirical findings whether by means of quantitative qualitative research methods, is challenging (Rösken-Winter, Hoyles & Blömeke, 2015). Even m demanding is spreading evidence-based CPD by scaling initiatives and innovations which t maintain themselves for an extended time period. In this regard, aligning research and policy as as possible is crucial and demands CPD approaches on a systemic level (Hoyles & Mundi 201 Following the examples of other countries, in Germany a center was established to implement s an approach. The DZLM (Deutsches Zentrum für Lehrerbildung Mathematik—German Centre Mathematics Teacher Education) intends to provide high-quality CPD for mathematics teach while settling principles and quality criteria to define CPD standards. The center gives particu emphasis to the research-based development of CPD courses while following a Design-Ba Research approach. Aim and rationale of the discussion group are to focus on the development CPD, thus to attend to conditions and requirements, on the one hand, and to outline how resea perspectives can be pursued that contribute to our knowledge about effects and sustainability.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.
AN ACT OF MATHEMATIZATION FOR THE FAMILIARIZATION WITH FRACTIONAL NUMBERS

Abstract: In spite of the efforts over half a century both in research and in practice, the results of teaching fractional numbers are not satisfactory and difficulties are widespread and persistent. We have started an unusual project concerning the introduction of the fractional numbers, in the third degree of primary school. The key points of our proposal are: (1) a process of familiarization with fractional numbers; (2) fractional numbers as a new universe; (3) the foundation is an act of elementary and fundamental mathematisation which identifies the action of comparing homogeneous quantities with a pair of natural numbers; it differs both from an excessively formalized approach and from modelling; (4) the measure of a quantity is defined as the comparison between the quantity and the “whole”; the term “unit” is reserved to indicate the “common unit”; (5) “dialogy among the activities” is the act of playing the different manipulative, depending on the properties you want to present.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.

CURRENT PROBLEMS AND CHALLENGES IN NON-UNIVERSITY TERTIARY MATHEMATICS EDUCATION (NTME)

Abstract: This discussion group will focus on issues related to mathematics education in non-university tertiary institutions (NTME). Institutions in this category confer academic degrees, but have undergraduate education as their primary focus. Institutions may be academically or vocationally focused, granting terminal degrees and certifications or preparing students to transfer to university.

Anticipated aims of a discussion group during ICME-13 include: identifying, sharing, and discussing solutions to common key issues, challenges, and opportunities pertaining to all areas of mathematics education in NTMEs throughout the world.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.

MATH FOR 21ST CENTURY SCHOOL. THE RUSSIAN EXPERIENCE AND INTERNATIONAL PROSPECTS

Abstract: The origins of Russian mathematical education can be traced back to renowned Leonhard Euler. During the last hundred years much has happened to make mathematics and math education in Russia a remarkable part of national culture. We should mention: Russian mathematicians A. Kolmogorov, I. Gelfand and others, actively and deeply participated in mathematical education, including this for secondary school, Russian system of mathematical Olympiads, System of high-schools for students gifted in math,
Kvant (Russian: for “quantum”) magazine in mathematics and physics for school students and teachers. In mid 1980-s Russian mathematical education was extended with the area of “informatica”, including fundamentals of mathematical logic and theory of algorithms. ICT tools for mathematical activities are used nowadays in pre-school and primary school. Dynamic geometry is used to promote experimental and open-ended learning. An inauguration decree (2012) of President Putin started development of the Conceptual Framework for Development of Mathematical Education in Russia. We propose to share Russian experience and ideas for further development to be used for the world math education community.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.

**TEACHING LINEAR ALGEBRA**

**Abstract:** Research on students’ conceptual difficulties with linear algebra first made an appearance in the 90’s and early 2000’s (e.g. Carlson, 1997; Dorier & Sierpinska, 2001). Over the past decade, research on linear algebra has concentrated on the nature of these difficulties and students’ thought processes (e.g. Stewart & Thomas, 2009; Wawro, Zandieh, Sweeney, Larson, & Rasmussen, 2011). The aim of the discussion group is to initiate a multinational research project on how to foster conceptual understanding of Linear Algebra concepts.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.

**CREATIVITY, AHA!MOMENTS AND TEACHING-RESEARCH**

**Abstract:** The Discussion Group is proposed to investigate the nature of creativity of Aha!Moments in mathematics through the coordination between the bisociation theory proposed by Koestler (1964) in his Act of Creation and recently published accounts of Aha!Moments in literature of mathematics education. Koestler definition of creativity uncovers creativity’s cognitive aspect in the creation of new schema of thinking by connecting previously unconnected frames of reference; his realization connects the cognitive and affective aspects through the principle of cognitive/affective duality of the Aha!Moment (Czarnocha, 2014). That act of liberation has the power to significantly increase motivation of students, and consequently, their levels of achievement. Presence of an affective dimension of the Aha!Moment has been empirically observed and discussed by Liljedahl (2013). (Palatnik, & Koichu, 2015) realize that the aha-experience might be found over a consideration of what might students attend to, and how, and why. The work of the Discussion Group will provide an example of the process of coordinating teaching practice and a theory. Results of the DG will be presented by PP on PME 40 in Szeged.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.
TRUTHFULNESS, OPEN-MINDEDNESS AND EVIDENCE: SEEKING THE INTELLECTUAL VIRTUES IN SCHOOL MATHEMATICS

Abstract: The intellectual virtues have been described by Sockett (2012) as including aspects such as truthfulness, open-mindedness and evidence. Building on the ideas of Aristotle and MacIntyre (2007), who called for a rediscovery of Aristotelian ethics in contemporary society, Sockett claims that these virtues are the mark of an educated human being and should form a central goal of education. However, neither Sockett nor others with an interest in education and philosophy have specifically identified how such virtues can be developed through the core disciplines such as mathematics. In this Discussion Group we propose to:

a) Introduce and discuss key concepts of virtue ethics, specifically the intellectual virtues;

b) Examine how the intellectual virtues might inform mathematics education, specifically mathematics curriculum;

c) Examine how mathematics education might contribute to broader goals of education, specifically the fostering of intellectual virtues; and

d) Commence an ongoing discussion of intellectual virtues in mathematics education, leading to the presentation and publication of papers in mathematics education and educational philosophy conferences and journals.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.

SHARING EXPERIENCES ABOUT THE CAPACITY AND NETWORK PROJECTS INITIATED BY ICMI

Abstract: The Capacity and Network Project (CANP) is a development project of the International Commission of Mathematical Instruction (ICMI) supported by the International Mathematical Union (IMU), UNESCO and the International Council of Scientific Unions (ICSU) as well as regional governments and institutions. The project is a response to Current Challenges in Basic Mathematics Education (UNESCO, 2011), which includes a call not just for mathematics education for all but for a mathematics education of quality for all. Five CANPs have been organised so far. The purpose of the Discussion Group at ICME 13 consists in sharing experience about challenges and opportunities in preparing for a CANP event. Discussions will be guided by the following key questions: what are key issues that impact mathematics learning and achievement in developing contexts (e.g. poverty, gender, linguistics, regional marginalization)? What are the similarities and differences from the different CANP regions/events? What significant role networks can play in building synergies across disciplines and geographies with regard to this issue?

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.
Discussion Groups

Time: Tuesday, 26 July 2016 and Friday, 29 July 2016, 16.30–18.00
Location: B: dark-brown, East Wing Building, room 221
Organising team: Luz Valoyes-Chavez* (1), Danny Bernard Martin* (2), Joi Spencer* (3), Paola Valero* (4)
(1: Universidad Santiago de Cali; 2: University of Illinois at Chicago.; 3: University of San Diego; 4: Stockholm University)
WHITE SUPREMACY, ANTI-BLACK RACISM, AND MATHEMATICS EDUCATION: LOCAL AND GLOBAL PERSPECTIVES

Abstract: The ubiquity and persistence of racism, in all its forms on a global scale, stems from the fact that the meanings for race and racial categories are created, politically contested, and recreated in any given sociohistorical and geopolitical context as a way to maintain boundaries of difference related to domination and oppression (Omi & Winant, 1994). Mathematics Education, as an institutional field of practices is not exempt from racism and issues of power. It is a racialized domain, an instantiation of white institutional space controlled primarily by White and male researchers. Mathematics education is also a political project that serves larger racial projects (Martin, 2013). Yet, critical reviews of the extant research literature suggest that the realities of white supremacy, anti-Black racism, and xenophobia are not globally reflected as considerations in mathematics education research. Thus, the discussion group is aimed at facilitating discussions to explore the current state of research directed to uncover the mechanisms and practices responsible for the reproduction and maintenance of racial domination within mathematics education.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.

Time: Tuesday, 26 July 2016 and Friday, 29 July 2016, 16.30–18.00
Location: C: turquoise, Main Building, lecture hall K
Organising team: Claire Wladis*
(City University of New York)
RESEARCH ON NON-UNIVERSITY TERTIARY MATHEMATICS

Abstract: The focus of this group will be mathematics education research within the non-university tertiary context, with a particular focus on questions related to what happens inside mathematics classrooms in these institutions. Students enrolled in these institutions are more likely to belong to groups that have traditionally been both underrepresented in mathematics (and in higher education more generally) and that are at higher risk of college dropout: they are often the first in their families to attend college, they tend to be older, have work and family responsibilities, and on average have weaker pre-college preparation.

Details of the discussion group and the timetable can be found in the programme on the website and in Conftool.
Workshops

**FLIPPED TEACHING APPROACH: COGNITIVE AND NONCOGNITIVE GAINS**

**Abstract:** This workshop will provide background information about the flipped teaching approach (FTA) and its merits and present some research findings about studies on the FTA using various ICTs in different mathematics subjects at De La Salle University-Manila/Dasmariñas, Philippines. This workshop will serve as a venue for discussion about the FTA and a springboard for more research activities in related areas.

**Details of the workshop and the timetable can be found in the programme at the website and in Conftool.**

**DESIGNING MATHEMATICS TASKS FOR THE PROFESSIONAL DEVELOPMENT OF TEACHERS WHO TEACH MATHEMATICS STUDENTS AGED 11–16 YEARS**

**Abstract:** This workshop focuses on identifying and developing tasks that are appropriate to use in professional development with mathematics teachers of 11–16 year olds who self-identify as being “non-specialists” in mathematics. The professional development of this group of teachers tends to get overlooked because of the focus on senior secondary mathematics and primary mathematics. Many non-specialist teachers of mathematics lack confidence in their knowledge of mathematics and yet they play a pivotal role in the mathematical education of students. There is much still to be learned about what constitutes appropriate professional development for them – from both a mathematical perspective and in terms of pedagogy.

**Details of the workshop and the timetable can be found in the programme at the website and in Conftool.**

**CONTRIBUTING TO THE DEVELOPMENT OF GRAND CHALLENGES IN MATHS EDUCATION**

**Abstract:** Other fields have identified a list of Grand Challenges to prioritize the most pressing problems that research should address. The NCTM Research Committee wrote and published in JRME (http://bit.ly/1Yd4q2V) a commentary that argues for initiating this approach for mathematics education. If the field of mathematics education were to come together and identify a list of Grand Challenges for Maths Education, what might the list include? Could and should we initiate a process to generate that list? What are the associated benefits and risks? While significant differences exist in our local and national challenges, there are also likely to be
significant overlap. The endeavor of ICME is founded on the desire to “promote the collaboration, exchange
and dissemination of ideas and information on all aspects of the theory and practice of contemporary
mathematical education.” (ICMI Hompage.) The voluntary participation in and adoption of a common
set of Grand Challenges in Maths Education work to support the international collaboration toward common
challenges. We invite an open discussion, dialogue, and potential future collaboration on the topic of
Grand Challenges in Maths Education.
Details of the workshop and the timetable can be found in the programme at the website
and in Conftool.

Time: Tuesday, 26 July 2016, 16.30 – 18.00
Location: H: orange, Educational Building, room 06
Organising team: Kerry Cue*
(Mathspig Blog)
HOW MANY M&MS WILL KILL A 14YO? REVERSING THE DECLINE IN STEM STUDIES
BY MAKING MIDDLE-SCHOOL MATHS REAL, RELEVANT + FUN

Abstract: Over the last 20 years participation in STEM studies in senior school and at tertiary level has
steadily dropped in many western countries. The maths experience of middle school students is important
as it impacts on the number of students that flow on to higher-level STEM studies.
This paper looks at reasons why middle-school students ‘hate maths’ and the entertaining workshop
program is designed to show participants how maths – serious maths, funny maths, crazy maths – can be
found anywhere in the culture and utilised in the middle school maths classroom to make maths real,
relevant and fun for all students.
Kerry Cue aka Mathspig is an Australian humourist, journalist, author and humorous maths blogger.
Her popular Mathspig blog has over 1,000,000 hits.
Details of the workshop and the timetable can be found in the programme at the website
and in Conftool.

Time: Tuesday, 26 July 2016, 16.30 – 18.00
Location: K: purple, Law Building, room 18/19
Organising team: Guillermo Curbera* (1), Bernard Hodgson* (2), Birgit Seeliger* (3)
(1: Universidad de Sevilla, International Mathematical Union; 2: Université Laval; 3: International
Mathematical Union)
“OLDIES BUT GOODIES”: PROVIDING BACKGROUND TO ICMI MISSION AND ACTIVITIES
FROM AN ARCHIVAL PERSPECTIVE

Abstract: The aim of this workshop is to draw attention to the importance and usefulness of
archiving among the mathematics and mathematics education communities, presenting some of today’s
modern technical tools and focusing on the case of the ICMI Archive—a subset of the Archive of the
International Mathematical Union. This Archive contains a wealth of documents helping to understand how
a scientific community operates at the international level. We intend to illustrate the usefulness of archiving
in order to keep an accurate image of the activity of mathematicians and mathematics educators.
Questions to be examined include: By whom and for whom archiving? Why archiving? What archiving?
Discussion of the accessibility and long-term preservation of documents will include the issue of archiving
emails. We will present the Media Archive, a new way of archiving images: the community archives its
own history through this open media platform. We will present an overview of the ICMI Archive content.
We will survey examples of recent research with a historical flavour using information found in the
Archive. A selection of “gold nuggets” discovered among the Archive documents will be presented.
Details of the workshop and the timetable can be found in the programme at the website
and in Conftool.
TEACHING MATHEMATICS WITH STUDENTS FROM CULTURALLY AND LINGUISTICALLY DIVERSE BACKGROUNDS

Abstract: Focusing on upper elementary and midlevel mathematics, this interactive workshop is geared towards an audience of practitioners who want to experience methods useful to engage culturally and linguistically diverse students in meaningful learning. This workshop employs a mix of research presentation, activities, and conversations on teaching in today’s classrooms. Gay’s (2010) framework of culturally responsive teaching will be used to discuss how to create equal learning opportunities for all learners. From an understanding that diversity is an asset to our classrooms, participants will be introduced to strategies to foster cultural and language learning activities which are useful in enhancing math lessons. This bilingual workshop will be partly in German and partly in English to emphasize the challenges language learners may experience. Practitioners will be given guidance and strategies for implementing culturally responsive teaching in classrooms. The strategies may be especially relevant for teachers of mathematics in Germany given the current increase of culturally diverse students.

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.
THE POWER OF GEOMETRY IN THE CONCEPT OF PROOF

**Abstract:** Using in our schools too often neglected geometry, engaging teaching can be achieved almost without words in contemplative pantomime settings. The aim of the workshop is to show the power of geometry in the development of the concept of proof. Several relatively easy geometric ideas will be presented through simple mind provoking questions and by the use of technology. The aim of these questions is not solely to motivate the answer, but is much deeper and educationally wider. Namely, the aim is to motivate the understanding and the beauty of the resolved uncertainty brought by the certainty of a proof. In a way, a proof should be as much an emotional experience as a rational achievement. Participants will be challenged with several mind provoking questions, followed by individual engagements in the form of short problem solving sessions and concluded by joint discussions. By the use of geometry, we aim to show, that to learn and appreciate mathematics, one needs to understand the concept of proof. And in order to understand the concept of proof, one needs to experience the challenge of uncertainty that precedes the certainty of a proof.

**Details of the workshop and the timetable can be found in the programme at the website and in Conftool.**

SHOUT FROM THE MOST SILENT NATION, NORTH KOREA: CAN MATHEMATICS EDUCATION BE POLITICALLY NEUTRAL?

**Abstract:** This workshop addresses mathematics education in one of the most closed countries in the world — North Korea, as an extreme example of political influences on mathematics education. North Korean secondary school mathematics education is examined through the review of North Korea’s social and educational structures as well as its political and ideological position. In-depth interviews were conducted with defectors, who are now in South Korea, former secondary school mathematics teachers and students, to understand their real life experiences in school mathematics in North Korea. Workers’ Party’s influence on mathematics education and the impact the March of Suffering are examined. There are two main focuses of this workshop. One is to introduce an extreme case study of mathematics education in North Korea influenced by political and ideological standpoint. This will broaden the participants’ understanding of mathematics education as not only a self-regulating subject, but also as an interwoven matter shaping and shaped by the vessel and the people in it. This will also propose a chance to reassess the participant’s own mathematics education system with possibly enhanced span.

**Details of the workshop and the timetable can be found in the programme at the website and in Conftool.**
Workshops

Time: Tuesday, 26 July 2016, 16.30–18.00
Location: B: dark-brown, East Wing Building, room 120
Organising team: Sarva Brenda Letchumee*
(PRO INTELLECT / CGL Primary School)
SCEDUS MATH A LEARNING PLATFORM WHERE MATH BECOMES CREATIVE, INTERACTIVE AND EXCITING

Abstract: Practice! Practice! Practice! That’s how most students learn addition or division. However, children are more receptive to learning when the learning is associated with play than with work. SCEDUS MATH, a revolutionary learning method, is designed to instil students strong foundational skills that can help them excel in the competitive marketplace both in Malaysia and internationally. SCEDUS MATH is more than learning Math. It provides a unique learning platform that will help students acquire and apply crucial life skills such as Creativity, Critical Thinking, Communication and Collaboration. SCEDUS MATH uses multidisciplinary card games to facilitate a systematic way of learning Mathematics. The Math cards carry real life problems that would require students to use Mathematics skills to solve them as a team. The team-based problem solving technique will encourage sharing, turn-taking and social skills. Answers to assigned problems will unfold in a creative fashion as they complete various tasks associated with the problems. SCEDUS MATH makes learning Mathematics easy and creates fun and excitement for both students and teachers.

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.

Time: Tuesday, 26 July 2016, 16.30–18.00
Location: E: mint, Economical Building, room 0029
Organising team: Wai Leng Lye* (1), Karen Low* (2)
(1: National Junior Collge; 2: Methodist Girls’ School)
HARNESSING TECHNOLOGY AS A TOOL FOR COLLABORATIVE LEARNING AND ASSESSMENT

Abstract: In this workshop, the presenters will share their experiences on the use of educational technology to deliver the lesson unit package and assessments comprising the collaborative learning principles.
Participants will have a hands-on experience at collaborative learning and assessment design through the use of ICT.
Participants are required to bring their own laptops for this workshop.
At the end of the workshop, participants will be able to:
(1) Appreciate the use of the flipped classroom model to increase student-student interactions.
(2) Learn strategies to develop students’ collaborative learning capabilities through engaging themselves in the use of ICT.
(3) Design appropriate assessments, based on Bloom’s Taxonomy, to deepen students’ mastery and developing 21st century competencies.

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.

Time: Tuesday, 26 July 2016, 16.30–18.00
Location: H: orange, Educational Building, room 212
Organising team: Sabine Meinck*, Oliver Neuschmidt, Milena Taneva
(IEA DPC)
USE OF EDUCATIONAL LARGE-SCALE ASSESSMENT DATA FOR RESEARCH ON MATHEMATICS DIDACTICS
Workshops

Abstract: As a leading entity in the field of education for nearly 60 years, IEA promotes capacity building and knowledge sharing to facilitate innovation and foster quality in education. All data arising from IEA studies provide a tremendously valuable and rich source for secondary analysis in many fields of educational research, including the didactics of mathematics. The primary objective of this workshop is to show that and how IEA study data can be used for the purpose of improving teaching mathematics. We will (i) introduce the structure of IEA data, (ii) show access paths to data sources, technical documentation, analysis guides and software tools, and (iii) explain the possible uses of data for researchers who focus on the didactic of mathematics. All this will be done at the hand of the two studies TIMSS and TEDS-M including practical examples.

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.

Time: Tuesday, 26 July 2016, 16.30–18.00
Location: E: mint, Economical Building, room 3016
Organising team: Maria Mitchell* (Central Connecticut State University)

LEARNING FORWARD

Abstract: The goal of this workshop is to inform educators ready to teach middle and high school mathematics topics that aligns with the Common Core State Standards for Mathematics, specifically the Mathematical Practices integrated with the Content Standards.

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.

Time: Tuesday, 26 July 2016, 16.30–18.00
Location: D: yellow, West Wing Building, room 222
Organising team: B. David Redman, Jr.* (Delta College)

SYMMETRY, CHIRALITY, AND PRACTICAL ORIGAMI NANOTUBE CONSTRUCTION TECHNIQUES

Abstract: The workshop will illustrate several educational and entertaining applications of origami in the classroom. The activities illustrate symmetry, chirality, and duality in simple modular origami as well as the flexibility of Pentagon-Hexagon Zig-Zag (PHiZZ) units in constructing more sophisticated models. Additional illustrations of counting and graph coloring will be provided.

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.

Time: Tuesday, 26 July 2016, 16.30–18.00
Location: H: orange, Educational Building, room 206
Organising team: José L. Rodriguez* (1), David Crespo (2), Dolores Jiménez (3)
(1: University of Almería; 2: IES Alborán; 3: CEIP San Fernando)

SIERPINSKI CARPET PROJECT

Abstract: The Sierpinski Carpet Project is a nonprofit, collective and joint activity among children, from 3 to 16 (extended to to 99 years old), around the world. The result is a giant geometric fractal, known as Sierpinski Carpet, with colored squared stickers. The project, which started on May 2014, culminates on May 2016, involving more than 40,000 children of 400 schools of 38 countries.

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.
**TIME MANAGEMENT AND WORK ORGANIZATION**

**Abstract:** Doing a PhD, most students have to deal with many different tasks at the same time such as teaching, researching, reading, taking part in lectures/trainings/team meetings, etc. To cope with all the different requirements and expectations, strategies for self-management and self-motivation can help you get by. In this workshop, we will address the following questions: How can you efficiently organize your to-do list? What are strategies for setting priorities? How can you set yourself aims and stick to them? After a short interactive presentation, we will invite you to share your experiences and strategies with the other participants.

The workshop is supposed to introduce some methods and background knowledge of self-management to young researchers, such as the ‘Eisenhower method’ for setting priorities, the ‘pareto principle’ or ‘getting things done’ by David Allen. The workshop has been conducted during the German Nachwuchstag for 3 years in a row and has been given very positive feedback from the participating PhD students.

**Details of the workshop and the timetable can be found in the programme at the website and in Conftool.**

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**GUIDED SELF-DISCOVERY OF ELEMENTARY SCHOOL MATHEMATICS: THE MATIFIC PROJECT**

**Abstract:** According to Jean Piaget, “whenever we teach children something, we deny from them the ability to discover it on their own”. This workshop explores how carefully designed software and “gamification” can help children learn mathematics, from kindergarten to 6th grade, in a constructive and structured process of self-discovery.

The workshop will focus on the following issues:
- The pedagogical virtue and cognitive impact of self-discovery.
- How to create games and activities that promote self-discovery.
- Streamlining the self-discovery process: staging, hinting, rewarding.
- The teacher’s role in self-discovery.

During the workshop we’ll discuss several examples of mathematics education games, taken from the Matific project (www.matific.com), designed by the workshop organizers and others. Each game uses gamification and constructive learning techniques to promote self-discovery.

**Details of the workshop and the timetable can be found in the programme at the website and in Conftool.**
THE LIGHT GAME: AN ACTIVITY OF LINEAR SYSTEMS

Abstract: This booklet contains four activities in which it is proposed that students imagine two lamps (for the first activity) or three lamps (for the third and fourth activities), each one containing one switch. Concepts of congruence modulo 2 and congruence modulo 3 are developed on these activities.

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.

REHEARSING INSTRUCTIONAL ACTIVITIES TO SUPPORT ONGOING PROFESSIONAL DEVELOPMENT OF MATHEMATICS TEACHERS

Abstract: The challenge of formative assessment is less often generating evidence of student learning and more often deciding what to do based on that evidence. Over the last several years, particularly through the transition to the Common Core State Standards, US mathematics teachers have paid careful attention to useful and less useful tools for collecting evidence of learning. Successful professional development will support teachers in making effective use of that evidence. Instructional Activities allow teachers to focus on pedagogical decisions by relying on routinized thinking structures to sustain meaningful classroom interactions. While the rehearsal of these instructional activities has been explored in training pre-service teachers, this workshop will offer a model for deploying the rehearsal of ambitious instructional activities in a sustained professional development program.

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.

A KNOWLEDGE DISCOVERY PLATFORM FOR SPATIAL EDUCATION: APPLICATIONS TO SPATIAL DECOMPOSITION AND PACKING

Abstract: The workshop aims to introduce the XColony Knowledge Discovery Kit – a new teaching platform based on geometric manipulatives and designed in the STEM education context for training creativity and spatial intelligence in primary and middle school students. After a brief introduction of the basic concepts, participants are invited to evaluate the platform from students’ perspective by actively participating in hands-on mini projects, with the goal of constructing 3D structures that allow them to discover new geometric properties. A relevant case study on how the platform can be utilized in class is presented and the participants discuss and identify other mathematical concepts and educational activities conducted in a similar manner. The workshop concludes with a test that participants can voluntarily take, or they can take it home and use it as a self-evaluation tool for spatial intelligence.

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.
Workshops

**THE ROLE OF THE FACILITATOR IN USING VIDEO FOR THE PROFESSIONAL LEARNING OF TEACHERS OF MATHEMATICS**

**Abstract:** We will work on: (1) how can and do facilitators guide work with mathematics teachers on video?; (2) what are the principles that guide our choices in our use of the video?; (3) what are the implications, for mathematics teacher learning, of these different choices made by facilitators? The organisers will work actively with participants to demonstrate two ways of working (using the same video clip). We aim to share the detail of practice and how wider principles are enacted when using video. The first way of working we offer is based on principles derived from Jaworski (1990) and Coles (2013, 2014). The second way of working is based on principles derived from Horoks and Robert (2007), Chesné et al. (2009), Chappet-Pariès and Robert (2011), Robert and Vivier (2013). We are interested in learning from experiencing each others’ practice and hope that discussion grounded in the common experiences at the start of the workshop will be rich in connections. We will focus on similarities and differences in how work with video can be orchestrated (including the role of the mathematics) and work on how research could be taken forward into the role of the facilitator of the use of video.

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.

**USING BRAIDS TO INTRODUCE GROUPS: FROM AN INFORMAL TO A FORMAL APPROACH**

**Abstract:** The workshop proposes a hands-on activity, particularly suitable for high school teachers, who can then propose the workshop in a classroom. Goals are to introduce or review some basic group theory and gain ideas to communicate topics in an engaging way. Braids are rich topological objects that can be easily turned into algebraic objects. The key concepts of the workshop are:
1. The formalization of braids as algebraic objects;
2. The operation of composition and the structure of group;
3. A comparison between the composition of braids and numerical operations;
4. Non-commutativity of the composition;
5. Distinguishing braids using invariants: the permutation associated with a braid.

These concepts will be discovered and examined by the participants through a concrete guided activity in small groups.

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.

**DESIGN FOR CURIOUS MINDS: SERIOUS PLAY**

**Abstract:** Children between the age of three and six are not only curious but also know more than we often think. What is remarkable and somewhat disturbing is that many of these interests seem to
disappear as soon as children enter school. Learning language skills and arithmetic ‘replace’ interesting
skills like problem solving, reasoning, argumentation, creative thinking and much more. Can we keep
the curiosity in the child? Can we further facilitate the development of these very valuable process
skills? We have identified many play-activities with a solid scientific content that led to new
insights how young children reason and think.

**Details of the workshop and the timetable can be found in the programme at the website**
and in Conftool.

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### INTERNATIONAL SIMILARITIES/DIFFERENCES IN EXPERIENCES/PREPARATION OF POST-GRADUATE STUDENTS AS TERTIARY INSTRUCTORS

**Abstract:** This workshop will bring together researchers from across the globe to discuss the
teaching preparation of post-graduate mathematics students tasked with teaching tertiary mathematics.
In the United States, post-graduate mathematics students are referred to as Graduate Teaching
Assistants (GTAs) and examination of their teaching-related professional development is on the rise.
However, we know very little about the similarities and differences in the ways post-graduate mathematics
students are involved in tertiary mathematics teaching and prepared for this teaching across the globe.
A main goal of the workshop is to initiate a conversation resulting in an international overview of
post-graduate mathematics student teaching preparation. We have recruited scholars who work in this
area to bring to the workshop their expertise from institutional, regional or national perspectives to discuss
similarities and differences with respect to two specific issues: (1) the ways that post-graduate mathematics
students are involved in tertiary level mathematics teaching and (2) the ways they are prepared for
this involvement in tertiary teaching of mathematics.

**Details of the workshop and the timetable can be found in the programme at the website**
and in Conftool.

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### USING LISP AS A TOOL FOR MATHEMATICAL EXPERIMENTATION

**Abstract:** In this workshop, we propose to present the high-level programming language LISP
as a tool for mathematical simulation and experimentation in a secondary mathematical educational
environment. The computer algebra system Maxima was implemented using LISP language.
We will introduce the fundamentals of the language and use it to study the “Impossible Problem”,
as named by Martin Gardner in 1979. The purpose is to show some possibilities of how students can
use this tool to investigate mathematical problems. It’s recommended to have a notebook or mobile
device, with a Common LISP implementation, in order to better accomplish the activities. Technical

**Details of the workshop and the timetable can be found in the programme at the website**
and in Conftool.
**WS**

**Mathematics Teachers' Circles as a Professional Development Model: Connecting Teachers and Universities**

**Abstract:** Mathematics Teachers' Circles (MTC) are professional development communities of mathematics teachers and professors who meet regularly to work on rich mathematics problems. Each MTC includes approximately 15 to 20 teachers. Most are middle school teachers, but many groups also include some high school or elementary school teachers. Groups also include several mathematics department faculty from a college or university, or other professional mathematicians from academia or industry. Ongoing research has begun to demonstrate the benefits of MTCs for teachers’ confidence, knowledge, and teaching of mathematics. Mathematics professors gain an opportunity to share their enjoyment of mathematics with teachers, contribute to teacher education and enrichment, and become more involved in the local education community.

During this workshop we propose to introduce participants to Mathematics Teachers’ Circles professional development models, engage them in MTC-type mathematics, share some results of MTC interventions, and open the discussion to further ideas and/or questions on implementing MTC in various cultural contexts.

**Details of the workshop and the timetable can be found in the programme at the website and in Conftool.**

**Analysis of Algebraic Reasoning and Its Different Levels in Primary and Secondary Education**

**Abstract:** An important objective in various curricular guidelines (e.g., NCTM, 2000) is the enhancement of algebraic reasoning since the first educational levels. This objective implies that we assume a new view of school algebra as being not limited to handling algebraic expressions (Aké, Godino, Gonzato & Wilhelmi, 2013; Godino, Ake, Gonzato & Wilhelmi, 2014). The effective implementation of this new conception of school algebra poses a challenge for the training of mathematics teachers, because few current training programs include the development of such new vision.

The objective of the workshop is to implement some practical activities aimed at recognizing the main features of School Algebraic Reasoning (SAR), which can be used to train teachers to promote algebraic thinking in primary and secondary education. The wider view of school algebra that will be presented and discussed takes into account the processes of generalization, symbolization, as well as structural and functional modelling and analytical calculation. It also creates a meaningful link between algebraic thinking in primary and secondary education.

**Details of the workshop and the timetable can be found in the programme at the website and in Conftool.**
DESIGNING AND EVALUATING MATHEMATICAL LEARNING BY A FRAMEWORK OF ACTIVITIES FROM HISTORY OF MATHEMATICS

Abstract: Working on a framework from history of mathematics (octagon of eight activities) for designing and evaluating of math. learning environments (Haapasalo/Zimmermann 2015).

Questions:
Relation of these activities to other ideas/activities (Bruner 1977, Bishop 1988)? Colleagues, who are interested, should have read the corresponding parts of these books. Please, name + e-mail-address until 7/15 to lenni.haapasalo@uef.fi + pertti1@gmx.de
Octagon useful as a framework for designing and evaluating?

Structure:
• Presentations by the organizers.
• Group-work on:
  Improvement of the instrument?
  Testing and use of the improved instruments?

References:

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.
ADOPTING MAXIMA AS AN OPEN-SOURCE COMPUTER ALGEBRA SYSTEM INTO MATHEMATICS TEACHING AND LEARNING

Abstract: In this workshop, a computer algebra system (CAS) Maxima will be introduced. The primary audience of this workshop is mathematics educators, particularly school teachers and university professors who have experience in teaching Calculus and Linear Algebra with a CAS and those who would like to introduce a possible alternative CAS into their classrooms. Maxima is a computer software can be used for the manipulation of symbolic and numerical expressions, including limit calculation, differentiation, integration, Taylor series, systems of linear equations, polynomials, matrices and tensors. It can also sketch some graphical objects with excellent quality. Some examples from Calculus will be presented and how Maxima plays a role in enhancing students’ understanding will also be discussed.

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.

SILENT SCREENCAST VIDEOS AND THEIR USE WHEN TEACHING MATHEMATICS

Abstract: The aim of this workshop is to introduce teachers and mathematics education researchers to the concept of silent screencast videos. This will be done by showing the results of a Nordic/Baltic research project, allowing the participants to work on their own commentaries to silent videos, and guiding them in the process of developing new silent videos.

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.

EXPLORING AND MAKING ONLINE CREATIVE DIGITAL MATHS BOOKS FOR CREATIVE MATHEMATICAL THINKING.

Abstract: When we look at e-books, designed for mathematics education, we can distinguish two streams. On the one hand we see publishers of traditional Mathematics textbook come with digital versions of their products, mostly static pdf-documents that can be downloaded and used on different devices. Anticipating on new interactive possibilities, sometimes limited interactivity is built in. On the other hand we see innovative groups of designers that traditionally develop highly interactive tools and micro-worlds for mathematics education. The European ‘MC-squared’ project aims to start several so-called ‘Communities of Interest’ (CoI) in a number of European countries (Fischer, 2001) that work on digital, interactive, creative, mathematics textbooks, called c-books. The c-books are authored in the MC-squared platform in which authors can construct books with various interactive ‘widgets’. This workshop aims to introduce the project and acquaint participants with the affordances and authoring process of the MC-squared platform.

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.
Time: Friday, 29 July 2016, 16.30–18.00
Location: E: mint, Economical Building, room 0077
Organising team: Tatsuya Mizoguchi* (1), Hideki Iwasaki (2), Susumu Kunimune (3), Hiroaki Hamanaka* (4), Takeshi Miyakawa* (5), Yusuke Shinno* (6), Yuki Suginomoto* (7), Koji Otaki* (8)
(1: Tottori University; 2: Hiroshima University; 3: Shizuoka University; 4: Hyogo University of Teacher Education; 5: Joetsu University of Education; 6: Osaka Kyoiku University; 7: Nagasaki University; 8: Hokkaido University of Education)

CURRICULUM DEVELOPMENT IN THE TEACHING OF MATHEMATICAL PROOF AT THE SECONDARY SCHOOLS IN JAPAN

Abstract: In the workshop, we aim to share a theoretical framework as well as some issues on the teaching of mathematical proof throughout six years (grade 7-12) of secondary schooling in Japan. The difficulties faced by students in learning mathematical proof are well-known (e.g., Reid & Knipping, 2010). Although the present research project is targeting Japanese mathematics curriculum, in developing a framework we attempt to synthesize multiple theoretical perspectives well known within the international mathematics education community in order to enable the framework to be comparable with those in other countries. Key questions in the workshop are as follows: (1) What kinds of teaching contents should be included in the secondary curriculum for the teaching of mathematical proof? (2) What kinds of evolution should be envisioned in the course of the curriculum? (3) How can we allow comparing different curriculums of the teaching of mathematical proof with different countries in terms of our proposed framework?

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.

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Time: Friday, 29 July 2016, 16.30–18.00
Location: D: yellow, West Wing Building, room 220
(1: State University of Campinas – UNICAMP; 2: University of Stavanger; 3: Federal University of ABC – UFABC; 4: Teachers College, Columbia University; 5: University of Huelva; 6: University of Ontario Institute of Technology)

REFLECTING UPON DIFFERENT PERSPECTIVES ON SPECIALIZED ADVANCED MATHEMATICAL KNOWLEDGE FOR TEACHING

Abstract: Teachers’ knowledge assumes a major role in practice and in the students learning and achievement. In particular, the construct of horizon knowledge or, what can be termed specialized advanced mathematical knowledge for teaching (in order to capture the overall perspectives we are dealing with within this proposal) has been the focus of attention from some researchers with different foci of attack (e.g., Carrillo, Climent, Contreras, & Muñoz-Catalán, 2013; Jakobsen, Thames, Ribeiro, & Delaney, 2012; Wasserman & Stockton, 2013; Zazkis & Mamolo, 2011). In that sense, and aiming to deepen our understanding of such a construct, the aim of this working group is to discuss and reflect upon, different theoretical perspectives, methodological approaches and analytic methods used when focusing on such specialized advanced mathematical knowledge for teaching. In particular, we consider the activities of analysing and conceptualizing situations where access and development of such teachers’ knowledge is of primary importance.

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.
**USEFUL TOOLS – SOFTWARE FOR (YOUNG) RESEARCHERS IN MATHEMATICS EDUCATION**

**Abstract:** There is a huge variety of computer programs, which can be more or less useful for (young) researchers in Mathematics Education. They range from tools to help you organize your literature (e.g. Citavi, Zotero or Endnote), analyze your data (e.g. MaxQDA, SPSS, NVIVO) or less specific programs which can be used for to-do lists and taking notes (e.g. Evernote, EndNote or OneNote). In this workshop, we will shortly introduce some of the mentioned programs and their main functions. Then, we’ll invite participants to share their own experiences, tips and tricks of which programs have proven useful for them and how they can facilitate the work and life of a young researcher. Participants are encouraged to bring their own laptops to the workshop.

**Details of the workshop and the timetable can be found in the programme at the website and in Conftool.**

**STRATEGIES FOR TEACHING MATHEMATICS TO STUDENTS LEARNING A SECOND LANGUAGE**

**Abstract:** In the past, mathematics was often thought to be a refuge for second language learners, a subject whose numbers and symbols could be understood by all. Today, however, it is understood that the learning of mathematics is mediated through language, creating special problems for students learning in a language in which they are not yet fluent.

Fortunately, research has surfaced a number of effective strategies for supporting second language learners to simultaneously learn mathematics while also learning the new language. One way to categorize these strategies is as follows:

- Making teachers’ presentation of mathematical content more comprehensible
- Providing more opportunities for student talk
- Providing support for enriching student talk to ensure that it is mathematically meaningful

While touching on strategies from all three categories, our talk will focus intensively on classroom protocols for supporting meaningful student talk.

**Details of the workshop and the timetable can be found in the programme at the website and in Conftool.**

**FRAMING NON-ROUTINE PROBLEMS IN MATHEMATICS FOR GIFTED CHILDREN OF AGE GROUP 11 – 15**

**Abstract:** The main aim of the workshop is to make the participants to coin non-routine problems in number patterns and elementary algebra. The underlying ideas are a) when several odd or even numbers with some restrictions are multiplied then a pattern is observed in the product and b) the simplifications of algebraic expressions can be successfully employed to solve some elementary number theory problems. These ideas are very useful for teaching gifted children, because they expect problems which involve
higher level of thinking. Two nonroutine problems one on each of the above mentioned concepts will be worked out through power point presentation to the participants by Dr. S. R. Santhanam.

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.

**Time: Friday, 29 July 2016, 16.30–18.00**
**Location: E: mint, Economical Building, room 3016**
Organising team: ileana Vasu*
(Holyoke Community College/University of Massachusetts)

**ENACTED MULTIPLE REPRESENTATIONS OF CALCULUS, STUDENT UNDERSTANDING AND GENDER**

**Abstract:** Despite interest in multiple representations as a trademark of mathematical success, Calculus instruction is mostly symbolic in nature and lacks consideration of gender specific issues in learning. Well-chosen representations are powerful at conveying mathematical concepts. They can be effective at the novice level or for students who perceive themselves as weak in math. They may also provide access to mathematical concepts for those students who lack operational expertise. Participants will exchange ideas about the role of mathematical representations in the curriculum as they explore connections between representations in the curriculum and student understanding, with an emphasis to gender. We will explore curricular materials, then in small groups we will design our own Calculus mini-lesson using multiple representations. We will convene in the whole group format to share ideas, and discuss key questions. In a final wrap-up session, the facilitator and participants will flesh out common themes, patterns, and notable emergent ideas. If possible bring copies of Calculus exams and a few sample pages from a Calculus text. You may also email them to the presenter at ivasu@hcc.edu

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.

**Time: Friday, 29 July 2016, 16.30–18.00**
**Location: K: purple, Law Building, room 18/19**
Organising team: Christine von Renesse*, Volker Ecke*  
(Westfield State University)

**USING INQUIRY TO TEACH MATHEMATICS IN SECONDARY AND POST-SECONDARY EDUCATION**

**Abstract:** Using active learning and inquiry approaches in the mathematics classroom has positive effects on students' beliefs, attitudes and learning outcomes, see for instance the study by Fremann at al. Yet it is difficult for teachers to make the shift from traditional lecture style to a more active classroom happen, partially because most of us only experienced traditional teaching ourselves. In this Workshop participants will first experience inquiry-based learning as students. We will then use the shared experience to discuss inquiry-based teaching and learning: what does it feel like as a student, what gets in the way of teachers exploring this way of teaching, and what are some of the many tools helpful for teaching successfully using inquiry (see e.g. www.artofmathematics.org/classroom). Both facilitators are co-principal investigators of the project "Discovering the Art of Mathematics" which is dedicated to bringing inquiry-based learning into the mathematics classrooms from elementary school through university.

Details of the workshop and the timetable can be found in the programme at the website and in Conftool.
**MAKING CARDS AS MATERIALS FOR TEACHING SPATIAL FIGURES**

**Abstract:** A static figure is used in the learning of plane figures. In contrast, it is important to present shapes with spatial extent and dynamic movement when teaching spatial figures. The following are the advantages of using the creation of pop-up cards as a teaching material. When making a card, a three-dimensional card is completed by trial and error, making a cut in a plane (the card), and opening and closing the folded card repeatedly. In this fabrication process, instruction connects the plane figures with the spatial figures. A popup card, called “origamic architecture,” is especially effective as a teaching material for this purpose. When you open a card that is folded in two, to 90 °, a three-dimensional object appears. When you flatten the card, it is returned to its original state.

To see works of origamic architecture, please refer to this website http://www.japandesign.ne.jp/IAA/chatani/ of Masahiro Chatani. Now, there are a lot of lovers of origamic architecture all over the world.

**Details of the workshop and the timetable can be found in the programme at the website and in Conftool.**

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**CREATIVE MATHEMATICS HANDS-ON ACTIVITIES IN THE CLASSROOM**

**Abstract:** Many children find that Mathematics is difficult and boring. But they are curious and they love to have fun with exciting things around them. Appropriate activities can be found to stimulate them to have fun and love to learn Mathematics. The workshop will show ways to develop creativity in Mathematics and Technology Education to increase intellectual curiosity, to develop problem solving and thinking skills, to promote discovery as well as to unleash creativity. In the workshop, the participants will share with each other how to make Mathematics lessons more meaningful, effective and interesting, how to cultivate intrinsic motivation for learning Mathematics, and how to develop thinking abilities, problem-solving skills and creativity.

Every participant will receive a fun and creative activity pack. Samples of creative hands-on activities will be demonstrated as follow: Curves in Nature, Reaction Time Test, Simple Balance, Mathematics of Robot arms, Augmented Reality (AR) in Mathematics Education.

**Details of the workshop and the timetable can be found in the programme at the website and in Conftool.**
Hands-on Mathematics –
An Exhibition from the Mathematikum Gießen

Albrecht Beutelspacher (Mathematikum Gießen & Justus-Liebig-Universität Gießen, Germany)

Opening: Monday, 13.00–19.00 / Tuesday to Saturday 09.00–19.00
Location: J: red, Auditorium Maximum, Lobby at the first and second floor

The Mathematikum Gießen is one of the world’s first mathematical science centers. It contains more than 150 interactive exhibits, which attract about 150,000 visitors each year. The idea of Mathematikum is to give everybody a chance to make a first step into mathematics. About half of the visitors are school classes, the other half are private visitors, mainly families.

The exhibits include puzzles, mirror experiments, and soap film experiments; the visitors can build bridges, start a ball race, and measure the golden section at themselves. They learn in an intuitive way about functions, optimization, and randomness. Questions to be posed: How can a bridge be constructed without using any nails, glue, ropes or other tools? How is rolling dice related to Mozart’s compositions?

The experience of 20 years working with mathematical experiments is that this is an ideal first step into mathematics. Being amazed is the first step to get behind mathematical secrets. Our different and very playful way of dealing with mathematics helps to overcome any fears people might have recalling their experiences with mathematics in school. It is in fact one step into mathematics, since the challenges of the exhibits are solved by careful thinking and grasping the right idea. On the other hand, it is of course only one step (and many more could follow), since a formal description and understanding is far beyond the possibilities of an exhibition.

In addition Mathematikum offers a special section for 4 to 8 year old children, the “Mini-Mathematikum”. It is often visited by kindergarten groups.

Mathematikum has also a few travelling exhibitions, which travel in Europe, but also – with the help of the Goethe Institute – all over the world.

The participants of ICME-13 have the possibility to experience a representative selection of the Mathematikum’s exhibits. In total, there will be more than 40 exhibits, including a few exhibits coming from the Mini-Mathematikum. All exhibits include an explanation in English and German, Albrecht Beutelspacher and his team will be present for explanations and sharing experiences.

Hopefully all visitors of the exhibition at ICME-13 will share the feeling that “math makes you happy”. In any case, they will leave the exhibition happier than they entered it.
Early Career Researcher Day

08.30 – 08.50 Opening:
Welcome by Gabriele Kaiser, Ferdinando Arzarello, Armin Jentsch, Thorsten Scheiner
Location: H: orange, Educational Building, lecture hall

Thematic Block A: Empirical methods (parallel workshops)
Time: Sunday, 24 July 2016, 09.00 – 12.00

A – 01. Design research
Koeno Gravemeijer, Susanne Prediger (1: Eindhoven University of Technology; 2: TU Dortmund)
Location: H: orange, Educational Building, room 105

A – 02. Mixed methods
Nils Buchholtz (University of Hamburg)
Location: H: orange, Educational Building, room 212

A – 03. Video-based research
David Clarke, Esther Chan, Carmel Mesiti (University of Melbourne)
Location: H: orange, Educational Building, room 208

A – 04. Qualitative text analysis
Udo Kuckartz (Philipps-Universität Marburg)
Location: H: orange, Educational Building, room 207

A – 05. Grounded Theory
Anne Teppo, Maike Vollstedt (University of Bremen)
Location: H: orange, Educational Building, room 08

A – 06. Use of educational large scale assessment data for research on mathematics didactics
Sabine Meinck, Oliver Neuschmidt, Milena Taneva (IEA DPC)
Location: H: orange, Educational Building, room 209

A – 07. Socio-cultural studies
Alan Bishop (Monash University)
Location: H: orange, Educational Building, room 106

A – 08. Ethnographic studies
Judit Moschkovich (University of California, Santa Cruz)
Location: H: orange, Educational Building, room 06

A – 09. Argumentation analyses
Christine Knipping, David Reid (Universität Bremen)
Location: H: orange, Educational Building, room 211

A – 10. Interaction analyses
Marcus Schütte (TU Dresden)
Location: H: orange, Educational Building, room 21

A – 11. Networking theories
Angelika Bikner-Ahsbahs (1), Tommy Dreyfus (2)
(1: Universität Bremen; 2: Tel Aviv University)
Location: H: orange, Educational Building, room 07
Thematic Block B: Important mathematics educational themes
**Time: 09.00 – 10.15 (Parallel lectures)**

B – 01. Theoretical aspects of mathematics education research
Stephen Lerman (London South Bank University)
**Location:** H: orange, Educational Building, lecture hall

B – 02. Frameworks and principles for task design in mathematics education
Carolyn Kieran (Université du Québec à Montréal)
**Location:** I: blue, Philosophical Tower, lecture hall E

B – 03. False choices in research paradigms: Studies of knowledge AND social interaction
Andrea diSessa (University of California, Berkeley, United States of America)
**Location:** I: blue, Philosophical Tower, lecture hall F

**Time: 10.45 – 12.00 (Parallel lectures)**

B – 04. International comparative studies
Kaye Stacey (University of Melbourne)
**Location:** I: blue, Philosophical Tower, lecture hall F

B – 05. The professional education and development of teachers
Ruhama Even (Weizmann Institute of Science)
**Location:** I: blue, Philosophical Tower, lecture hall E

B – 06. Thinking about mathematics as discourse:
What difference does it make for educational research and practice
Anna Sfard (University of Haifa)
**Location:** H: orange, Educational Building, lecture hall

Thematic Block C: Academic writing and academic publishing
**Time: 13.00 – 13.50**

C – Plenary presentation of major journals
Presenters: Merrilyn Goos (ESM), Jinfa Cai (JRME), Marcelo Borba (ZDM), Carolyn Maher (JMB), Olive Chapman (JMTE), Peter Liljedahl (IJSME), Charalambos Charalambous (MTL)
**Location:** H: orange, Educational Building, lecture hall

**Time: 14.00 – 15.30**
The activities to academic writing and academic publishing take place in parallel.

**Academic writing (Parallel sessions)**
C – 01. Academic writing
Aiso Heinze (IPN Kiel)
**Location:** H: orange, Educational Building, room 21

C – 02. Academic writing
Cynthia W. Langrall (Illinois State University)
**Location:** H: orange, Educational Building, room 08

C – 03. Academic writing
HelenForgasz (Monash University)
**Location:** H: orange, Educational Building, room 105

C – 04. Academic writing
Jeremy Kilpatrick (University of Georgia)
**Location:** H: orange, Educational Building, room 05
Early Career Research Day

C – 05. Academic writing
Norma Presmeg (Illinois State University)
**Location:** H: orange, Educational Building, room 06

C – 06. Academic writing
Richard Barwell (University of Ottawa)
**Location:** H: orange, Educational Building, room 106

C – 07. Academic writing
Vince Geiger (Australian Catholic University)
**Location:** H: orange, Educational Building, room 20

**Academic publishing (Parallel sessions)**
Discussion with one editor of the presented journals.

**Time:** 14.00 – 14.40

C – 08. Mathematical Thinking and Learning (MTL)
Charalambous Charalambous
**Location:** H: orange, Educational Building, room 208

C – 09. Journal of Mathematical Behavior (JMB)
Carolyn Maher
**Location:** H: orange, Educational Building, room 207

C – 10. Journal for Research in Mathematics Education (JRME)
Jinfa Cai
**Location:** H: orange, Educational Building, room 211

C – 11. ZDM Mathematics Education (ZDM)
Marcelo Borba
**Location:** H: orange, Educational Building, room 205

C – 12. Educational Studies in Mathematics (ESM)
Merrilyn Goos
**Location:** H: orange, Educational Building, room 206

Olive Chapman
**Location:** H: orange, Educational Building, room 209

C – 14: International Journal of Science and Mathematics Education (IJSME)
Peter Liljedahl
**Location:** H: orange, Educational Building, room 212

**Time:** 14.50 – 15.30
Presentation of the same journals by their editors in the same room, participants change rooms.

**Thematic Block D: Looking ahead**
**Sunday, 24th July 2016, 16.00 – 17.30**

What Makes for Powerful Classrooms, and How Can We Support Teachers in Creating Them?
A Story of Research and Practice, Productively Intertwined
Alan Schoenfeld (University of California, Berkeley)
**Location:** H: orange, Educational Building, lecture hall
Teachers’ activities at ICME-13

Within the framework of the 13th International Congress on Mathematical Education (ICME-13) special activities for teachers are offered, taking place from Wednesday, 27th July to Friday, 29th July 2016. The programme, which is run in German language, offers a special in-service programme with practice-oriented examples for innovative school development, novel classroom advancement with challenging teaching examples. The role of new technology will be reflected as well as the importance of elementary mathematics for the enhancement of the quality of mathematical teaching and learning processes. The teachers’ activities are focusing primary and secondary pre- and in-service teachers.

The presentations covering lectures and workshops are offered by well-known scholars from mathematics education, mathematics and school practice.

The themes cover, amongst others, basic ideas of central school mathematical concepts, inquiry-based learning, heuristic strategies in mathematics learning processes, origami as folded mathematics, inclusive mathematics education, language development in mathematics education, mathematics teaching and learning with heterogeneous students groups (covering students with dyscalculia and highly talented students), inclusion of modelling and real world examples in mathematics education.

In addition a mathematical exhibition from the Mathematikum Gießen (responsible Albrecht Beutelspacher) offers a rich exhibition of hands-on mathematics with fascinating new ways to explore mathematics.

Within these activities Günter M. Ziegler from the Free University Berlin offers at Thursday, 28th July a lecture open to the interested public on the theme: “Is that wrong, or is that art?” A challenging mathematical error search.

Details of the programme can be found at the website of ICME-13: http://www.icme13.org/lehrkraefte
With special thanks to:

Deutsche Mathematiker-Vereinigung

DZLM

Bundesministerium für Bildung und Forschung

Hamburg

DFG

Springer

Deutsche Telekom Stiftung

Robert Bosch Stiftung

CASIO

HP

Texas Instruments

Hamburg Convention Bureau
## General Information:

The Registration and Helpdesk will be opened at the following times:

- **Sunday, 24th** from 09.00 to 19.00
- **Monday, 25th** to Saturday, 30th from 07.30 to 18.00
- **Sunday, 31st** from 09.00 to 15.00

### Timetable ICME-13

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<tr>
<th>Time</th>
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<th>Tuesday, July 26th</th>
<th>Wednesday, July 27th</th>
<th>Thursday, July 28th</th>
<th>Friday, July 29th</th>
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<th>Sunday, July 31st</th>
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<tbody>
<tr>
<td>08.30 – 09.00</td>
<td>Opening Ceremony</td>
<td>08.30 – 09.00</td>
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<td>09.00 – 09.30</td>
<td>Plenary Lecture by Barton</td>
<td>09.00 – 09.30</td>
<td>Room Change</td>
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<td>Plenary Lecture by Kaur</td>
<td>Plenary Lecture by Loewenberg Ball</td>
<td>Coffee Break</td>
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<td>09.30 – 10.00</td>
<td>Coffee Break</td>
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<td>Room Change</td>
<td>Plenary Lecture by Barton</td>
<td>Plenary Lecture by Ziegler</td>
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<td>10.00 – 10.30</td>
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<td>10.30 – 11.00</td>
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<td>11.30 – 12.00</td>
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<td>Lunch</td>
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<td>12.00 – 12.30</td>
<td>Coffee Break</td>
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<td>Coffee Break</td>
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<td>Topic Study Groups (TSG)</td>
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<td>Room Change</td>
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<td>13.00 – 13.30</td>
<td>Coffee Break</td>
<td>13.30 – 14.00</td>
<td>Coffee Break</td>
<td>Coffee Break</td>
<td>Thematic Afternoon</td>
<td>Discussion Groups / Workshops / Oral Communications</td>
<td>Coffee Break</td>
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<td>13.30 – 14.00</td>
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<td>14.00 – 14.30</td>
<td>Coffee Break</td>
<td>Coffee Break</td>
<td>Oral Communications</td>
<td>Discussion Groups / Workshops / Oral Communications</td>
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<td>15.30 – 16.00</td>
<td>Coffee Break</td>
<td>16.00 – 16.30</td>
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<td>Coffee Break</td>
<td>Oral Communications</td>
<td>Poster Presentation</td>
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<td>16.30 – 17.00</td>
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<td>Coffee Break</td>
<td>Coffee Break</td>
<td>Oral Communications</td>
<td>Get-Together with Live Music</td>
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<td>Poster Presentation</td>
<td>Get-Together with Disco Music</td>
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**Note:** The Registration will be open from 08.00 to 19.00 on Sunday, 24th, and from 07.30 to 18.00 on Monday, 25th, Tuesday, 26th, Wednesday, 27th, Thursday, 28th, Friday, 29th, and Saturday, 30th. The Registration will be open from 09.00 to 15.00 on Sunday, 31st.