Tasks Design and Analysis

Xuhua Sun and Lalina Coulange

Aims

A critical topic in mathematics education is the design and analysis of open-ended, realistic, and exemplary tasks. Task design and analysis is a relatively new field, appearing for the first time as a topic of study (TSG 34) at ICME-11 in Monterrey, Mexico. It is developing quickly and dynamically as an area of international attention and active research.

Topic Study Group 31 will bring together researchers, developers and teachers who systematically investigate and develop theoretical and practical accounts of task design and analysis. We welcome proposals from both researchers and practitioners and encourage contributions from all countries. Presentations and discussions will target new trends, new understanding, and new developments in research and practice.

We have a particular interest in empirically grounded contributions that underline design principles and theoretical approaches, and give examples of tasks

Organizers Co-chairs: Xuhua Sun (China), Lalina Coulange (France); Team Members: Eddie Chi-keung Leung (Hong Kong), Nguyen Chi Thanh (Vietnam), Hea-Jin Lee (Korea/USA); Liaison IPC Member : Masataka Koyama (Japan).

X. Sun (✉)
University of Macau, Macau, China
e-mail: xhsun@umac.mo

L. Coulange
Universite de Bordeaux, Bordeaux, France
e-mail: lalina.coulange@gmail.com

designed for promoting mathematical development. We plan to discuss (but are not limited to) the following themes:

- Theoretical and practical development that guides task design and analysis
- Diverse theoretical approaches or principles that guide task design and analysis
- Diverse practical traditions/approaches that guide task design/analysis and their theoretical accounts
- Examples of task analysis for studying the relations between tasks, psychological development, and mathematical development
- Critical literature studies or meta-analysis of task design and analysis

The group will welcome contributions that focus on primary or secondary education. Research and development in task design and analysis presented at ICME-11 is retrievable at (<http://tsg.icme11.org/tsg/show/35>).

Organizations

On the website of ICME-12 it was possible to follow the planning process and eventually access all relevant documents including the timetable for TSG sessions. Each Session has four 90 min timeslots (on Tuesday, Wednesday, Friday and Saturday mornings). This made TSGs the prime forum for participation. We expected that participants engage in the review process prior to the conference, and we nominated respondents to all presentations in order to enable deeper levels of critical discussion during the conference. The presenters worked in pairs and made short comments or elaborated on each other's work after every presentation. In this way, TSG 31 was an active study group.

Submissions and Theme

The organizing committee received 12 submissions with 100 % acceptance rate (11 short oral presentations and 1 poster). The organizing committee assembled the accepted papers for TSG 31 into four groups for summary, presentation, and discussion:

- *Dynamic Geometry Environments and the Role of Representations*
- *Categorizations of Tasks and Textbooks*
- *Tasks Enacted by the Teacher and Students*
- *Discoveries and Justifications*

Schedule

Session 1 Tuesday, 10th July, 10:30–12:00, Dynamic Geometry Environments and the Role of Representations (Number of attendants: 24).

Opening remarks: Sun Xuhua susanna and Lalina Coulangue (20 min).

Mickael Edwards, Task Design and Analysis using the Measure-Trace-Algebratize Approach (25 min).

Teresa B. Neto, Xuhua Sun, Task design and analysis of on-to semiotic approach (25 min).

Eddie Chi-keung Leung, Hea-Jin Lee, Sun Xuhua (Main discussant speakers): Round-table discussion with the whole group on the 2 contributions (20 min).

Session 2 Wednesday, 11th July, 10:30–12:00, Categorizations of Tasks and Textbooks (Number of attendants: 32).

Regina Bruder, Eight target structure types of Tasks as background for learning surroundings (25 min).

Hyungmi Cho, Jaehoon Jung, Ami Kim and Oh Nam Kwon, An analysis of the mathematical tasks in the Korean 7th grade mathematics textbooks and workbook (25 min).

Lianzhong Fan, Jiali Yan, Xuhua Sun, The Changes of Task Design for Development “Two-Bases” in China after Ten-year Curriculum Reform (25 min).

Hea-Jin Lee, Nguyen Chi Tanh, Lalina Coulangue (Main discussant speakers), Round-table discussion with the whole group on the 3 contributions (15 min.)

Session 3 Friday, 13th July 11:00–12:30 Tasks Enacted by the Teacher and Students (Number of attendants: 35).

Rina Namiki and Yoshinori Shimizu, On the Nature of Mathematical Tasks in the Sequence of Lessons (25 min).

Julie Horoks, Analysing tasks to describe teachers’ practices and link them to pupils’ learning in mathematics (25 min).

Marita Barabash, Raisa Guberman, Multiple informal classifications of geometrical objects as an ongoing process of developing young students’ geometric insight (25 min).

Eddie Chi-keung Leung, Nguyen Chi Tanh, Lalina Coulangue Main discussant speakers: Round-table discussion with the whole group on the 3 contributions (15 min).

Session 4 Saturday, 14th July 10:30–12:00, Discoveries and Justifications (Number of attendants: 25).

Michael Meyer Forming concepts through discoveries and justifications (25 min).

Celine Constantin, Lalina Coulangue In search for a specific algebraic task design or how to elaborate a situation highlighting algebraic techniques in second grade (25 min).

Eddie Chi-keung Leung, Nguyen Chi Tanh, Hea-Jin Lee Main discussant speakers Round-table discussions of the session papers (15 min).

Sun Xuhua, Lalina Coulange Closing remarks: Whole group discussion on the work of the group and conclusion (25 min).

On-line Discussion Notes

<https://docs.google.com/document/d/1BIl7r2tN7ha8PQrr2J3xJu5gEQ05wPveDFV83EZdpvc/edit>.

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