

LINGUISTIC AND LOGICAL METHODOLOGICAL TOOLS TO ADDRESS LANGUAGE DIVERSITY IN MATHEMATICS EDUCATION

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Short description of the Workshop Groups: organizers, aims and underlying ideas

Viviane Durand-Guerrier has worked extensively on links between logic, language and learning of mathematics, with an interest for the specificity of contexts where the language of instruction is not the preferred language of the students. Cris Edmonds-Wathen is interested in how mathematics is expressed in different languages and how this is related to the grammars of different languages. Faiza Chellougui is interested in language diversity on research on language diversity. Judith Njamgong-Ngansop is interested in the impact of differing grammar of Ewondo compared to French in the teaching and learning of logic at the transition between secondary and tertiary level. Jean-Jacques Salone is interested in the way vernacular knowledge and languages affect the learning of mathematics, in particular of logical concepts.

The aim of the workshop is to share with an international audience the linguistic and methodological tools ([2], [3]) we are developing in our own multilingual contexts in order to discuss the possibility of their generalisation, how to improve them for wider use and to initiate international collaborations involving a variety of languages.

The main idea underlying this proposal is that in multilingual contexts differing grammatical structures of languages might affect the process of teaching and learning mathematics, whatever the level of instruction, considering that switching from one language to another in a classroom might be both an obstacle or a resource [5], and that translating even the most straightforward of mathematical statements from a language to another presents challenges ([4]). We also consider the issue raised by the translation of transcripts of classroom situations for communication of our research for an international audience ([6]), this being even more accurate for research on language diversity ([1]).

References

- [1] Chellougui, F., Nguyen Thi Thu, H. Winslow, C. (2016) Language diversity in research on language diversity in mathematics education. In R. Barwell & al. (Eds.), *Mathematics education and linguistic diversity* (pp. 263-278). New York: Springer.
- [2] Durand-Guerrier, V. "Contributions of logical analysis for mathematics education". In: Logic in question. M. Amirouche (dir). Studies in Universal Logic. Birkhäuser Basel (underpress)
- [3] Edmonds-Wathen, C. (2019). Linguistic methodologies for investigating and representing multiple languages in mathematics education research. *Research in Mathematics Education*, 21(2), 119-134.
- [4] Edmonds-Wathen, C., & Bino, V. (2015). Changes in expression when translating arithmetic word questions. In K. Beswick, T. Muir, & J. Wells (Eds.), *Proceedings of the 39th Conference of the International Group for the Psychology of Mathematics Education* (Vol. 2, pp. 249-256). Hobart, Australia: PME.
- [5] Edmonds-Wathen, C., Trinick, T., & Durand-Guerrier, V. (2016). Impact of differing grammatical structures in mathematics teaching and learning. In R. Barwell, & al. (Eds.), *Mathematics education and linguistic diversity*. (pp. 23-46). New York: Springer.
- [6] Geiger, V., Straesser, R. (2015) The challenge of publication for English non-dominant language authors in mathematics education. *For the Learning of Mathematics* 35/3. 35-41.

Planned structure:

The workshop will comprise one session of 90 minutes, with previous asynchronous activities.

The asynchronous activities will consist in watching videos presenting our methodological tools, such as in [2] or [3], answering a questionnaire, including a short transcript to translate in the participants own preferred language.

During the session, the participants will 1/ Share questions and comments on the methodological tools shared via the videos .2/ Small groups discussions on grammatical issues raised by the translation of the transcripts, and the relevance and the limits of the shared methodological tools. 3/ Collective synthesis of the small groups work. 4/ Perspective for possible future collaborations.

Planned timeline	Planned activity	Working format /Responsible person
Sunday July 11 th – Tuesday July 13 th	Asynchronous activities for preparing the online face-to-face session	Video for sharing logical methodological tools and questionnaire with a short translation task/ <i>Viviane Durand-Guerrier, Cris Edmonds-Whaten, Jean-Jacques Salone.</i>
Wednesday July 14 th , 21:30 – 23:00 - Face-to-face online session		
21:30-21:45	Sharing questions and comments on the methodological tools.	Collective work / <i>Viviane Durand-Guerrier & Cris Edmonds -Whaten</i>
21:45 – 22:15	Working and discussing on translation issues in multilingual contexts and in communication of research results	Small groups discussions on issues arising while the translation (5 groups) / All the members of the team ; one per room.
22:15 – 22:45		Reports by the team members and collective discussion / all the team members
22:45 – 23:00	Toward further collaborations	Collective discussion/ <i>Cris Edmonds-Whaten & Viviane Durand-Guerrier</i>

Venue requirement:

The workshop will be held online.

We will need to get the workshop participants list not later than Sunday afternoon (Shanghai time) to send the material (videos and link for the Google form) for the asynchronous activities.

During the face-to-face online session, we will need the possibility to break in five rooms for small groups works.