

## WHAT/HOW CAN WE LEARN FROM THE DEAF MATHEMATICS CLASSROOM?

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This *ad hoc*-session had its roots in the idea of looking from different perspectives and with entirely new eyes on a piece of data that has been gathered in the course of a larger project on deaf students' learning and conceptualization of mathematics—and the *ad hoc* interest in participating in such a session expressed in conversations during the poster session. The video data (Krause, 2018) presented an episode from a grade 5 deaf geometry classroom to provide an insight into how mathematics is taught and learned in such a specific setting, serving as input for the discussion, especially for those who came to the session without any previous experience with deaf education.

### SOME SPONTANEOUS IMPRESSIONS

A first spontaneous insight concerned the observation that when first encountering a mathematical idea through discourse, 'everything' has to be an action to make sense of the signs as means to communicate such that conceptual and referential understanding goes hand in hand. Moreover, mathematical experience might become more likely to be gathered by being the mathematical object, being put in the centre of the mathematical activity, in this case rotating a figure around a point for accessing the idea of point symmetry. While this action-based approach might be beneficial to provide concrete context to understand basic concepts that are accessible through perception, deriving at more complex and 'abstract' concepts that cannot be approached through action might become an issue. This sheds an interesting perspective on deaf students' struggles with abstraction as reported by practitioners (e.g., Brinkley 2011).

The discussion quickly moved away from the concrete case of deaf learners but towards finding similarities and differences in their way of learning to the case of others, e.g., the way dyslexic learners process information. One participant brought up that dyslexic learners process information holistically and struggle with a linear representation of information, just as deaf signers do. Insights on how mathematical knowledge is represented holistically through gestures or, more specifically, in sign language, and how this benefits the deaf learners might also become beneficial to support dyslexic learners. This potential interaction between two fields in special education that have not necessarily been seen as linked before provides an excellent example of how looking at a specific group of learners might provide a benefit beyond. But also much more in general, we agreed that we can learn a lot from "asking" different groups of learners, maybe also heading towards universal task and teaching design. However, an important methodological question with which we left the discussion is How we can become better able to come to understand the approaches of the special students? Certainly, this demands for combining a mixture of different methods of gathering and analysing data, both taking into account the specific background of the learners. Non-verbal expression might be taken into account through drawings to provide an additional resource, e.g., for the case of deaf or dyslexic learners, allowing them to fix their thoughts more holistically than possible through language.

## REFERENCES

- Brinkley, D. (2011). *Supporting deaf children and young people*. London, UK: Bloomsbury Publishing.
- Krause, C. M. (2018). Embodied geometry: Signs and gestures used in the deaf mathematics classroom—The case of symmetry. In R. Hunter, M. Civil, B. Herbel-Eisenmann, N. Planas, & D. Wagner (Eds.), *Mathematical discourse that breaks barriers and creates space for marginalized learners* (pp. 171-194). Rotterdam, the Netherlands: Sense.