



**HAL**  
open science

## Supporting young children's mathematical register learning in two languages: ICT possibilities

Troels Lange, Tamsin Meaney

► **To cite this version:**

Troels Lange, Tamsin Meaney. Supporting young children's mathematical register learning in two languages: ICT possibilities. CERME 10, Feb 2017, Dublin, Ireland. hal-01937309

**HAL Id: hal-01937309**

**<https://hal.science/hal-01937309>**

Submitted on 28 Nov 2018

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# Supporting young children's mathematical register learning in two languages: ICT possibilities

Troels Lange<sup>1</sup> and Tamsin Meaney<sup>2</sup>

Western Norway University of Applied Science; <sup>1</sup>[trl@hvl.no](mailto:trl@hvl.no); <sup>2</sup>[tme@hvl.no](mailto:tme@hvl.no)

*Keywords: ICT, kindergarten, bilingual mathematical language development, parents.*

## Language as a resource

We have recently begun a project where we assume that digital games/apps have the possibilities to utilise family and kindergarten language resources to support multilingual children's development of mathematical registers. In so doing, we adopt the perspective of "language as a resource" in which languages act as pedagogical resources in the learning of mathematics (Planas & Civil, 2013). Developing children's fluency in their home language as well as Norwegian is an aim of the Norwegian Framework Plan, the early childhood curriculum (Kunnskapsdepartementet, 2011). Research suggests that in regard to learning and using content knowledge such as mathematics, multilingual children benefit from developing both their home language(s) and the majority language for discussing abstract ideas (May, Hill, & Tiakiwai, 2004). However, when children speak a different language at home to the one in their kindergarten, it is difficult for teachers who do not speak the children's other languages to know how to provide support for developing the home language. Parents on the other hand have the language resources for developing the mathematics register in the children's home languages, although their contribution to their children's engagement with mathematics is often under-rated (Civil, Bratton, & Quintos, 2005).

## Digital games as prompts for mathematical language learning at home

There is little research about using apps/games to prompt dialogue about mathematics among young children, however what there is suggests that affordances of digital games/apps can promote discussions (Lange & Meaney, 2013; Lembrér & Meaney, 2016; Palmér & Ebbelind, 2013). Plowman, Stephen, and McPake (2010) found that children's engagement with digital tools at home were richer than those in kindergartens, partly because the children asked more questions and could learn from watching other family members using the devices.

In order to find out what digital games/apps were being used in multilingual families and to gain some understanding from parents of multilingual children (aged 1-5 years) about what they considered to be the mathematical register demands and affordances of the apps/games, we set up an online survey, using a snowballing sampling method. The survey had 8 questions that asked about the age of the children, the languages that they spoke and the digital games/apps that they played with.

56 parents identified the features of the digital games/apps that made them attractive to their 74 children and what they would include in a digital game/app if they were designing one. The features of the digital games that the parents would include were not the same ones as they recognised that their children valued. Digital games were recognised as providing children with opportunities to use aspects of the mathematics register. Although puzzles was frequently cited as a digital game that the children played, this did not seem to result in the features of shapes being discussed to the same

degree as other mathematical ideas (about half the number of parents considered their children talked about this as compared with attributes for classifying things).

The parents identified that being successful or being surprised prompted children to talk about the digital game. Having features in new digital games which would produce such feelings in children appears likely to develop discussion with adults about mathematical ideas. As the language of the game can influence the children's use of language, it seems best not to include any language so as not to restrict the choice of language.

## References

- Civil, M., Bratton, J., & Quintos, B. (2005). Parents and mathematics education in a Latino community. *Multicultural Education*, 13(2), 60–64.
- Kunnskapsdepartementet. (2011). *Framework plan for the content and tasks of kindergarten*. Oslo: Kunnskapsdepartementet [The Norwegian Ministry of Education and Research].
- Lange, T., & Meaney, T. (2013). Ipads and mathematical play: A new kind of sandpit for young children? In B. Ubuz, Ç. Haser, & M. A. Mariotti (Eds.), *Proceedings from the Eighth Congress of European Research in Mathematics Education* (pp. 2138–2147). Ankara: European Society for Research in Mathematics Education.
- Lembrér, D., & Meaney, T. (2016). Preschool children learning mathematical thinking on interactive tables. In T. Meaney, O. Helenius, M. Johansson, T. Lange, & A. Wernberg (Eds.), *Mathematics education in the early years: Results from the POEM2 conference, 2014* (pp. 235–254). New York: Springer. doi: 10.1007/978-3-319-23935-4.
- May, S., Hill, R., & Tiakiwai, S. (2004). *Bilingual/immersion education: Indicators of good practice. Final report to the ministry of education*. Hamilton, NZ: University of Waikato. Retrieved from: <https://www.educationcounts.govt.nz/publications/schooling/5079>
- Palmér, H., & Ebbelind, A. (2013). What is possible to learn?: Using ipads in teaching mathematics in preschool. In A. M. Lindmeier & A. Heinze (Eds). *Proceedings of the 37th Conference of the International Group for the Psychology of Mathematics Education.: Mathematics learning across the life span* (pp. 425–432). Kiel, Germany: PME.
- Planas, N., & Civil, M. (2013). Language-as-resource and language-as-political: Tensions in the bilingual mathematics classroom. *Mathematics Education Research Journal*, 25(3), 361–378. doi: 10.1007/s13394-013-0075-6.
- Plowman, L., Stephen, C., & McPake, J. (2010). Supporting young children's learning with technology at home and in preschool. *Research Papers in Education*, 25(1), 93–113.