

IDENTIFYING MATHEMATICAL COMPETENCY DEMAND IN NUMERACY ITEMS FOR GRADE 5 AND GRADE 8

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Being numerate means being able to understand the world around us through a mathematical lens, evaluate mathematical information embedded in a context, and use mathematics as a tool to solve problems in the real world (Geiger et al., 2015). A broadly used framework for describing skills necessary to be numerate is the “mathematical competencies” framework developed by Niss and Højgaard (2019).

Numeracy was integrated into curriculums in Norway in the 2006 curriculum reform. To help monitor the numeracy proficiency of Norwegian students, a national testing system was implemented as well. The study presented aims to describe the extent the national testing system measures the mathematical competencies outlined by Niss and Højgaard. The presentation will focus on the mathematical competency demand of items used in the Norwegian National Numeracy Tests (NNNT) in grade 5 and grade 8.

The items analyzed in this study were the items used in the 2018 NNNT. The sample of items consists of 95 items, of which 45 were developed and administered to grade 5 and 50 items to grade 8. The competency demand of the items was classified according to a mathematical competency classification scheme developed by Turner, Blum, and Niss (2015) using three raters, two with prior experience using the scheme.

The present study will describe numeracy as measured by NNNT, showing the competency demand of grade 5 and grade 8 items respectively, as well as showing how the competency demand increases from grade 5 to grade 8. Furthermore, the methods applied in this study may strengthen comparisons of constructs across assessment systems. Additionally, the study will inform test development for numeracy in lower grades as well as provide evidence of the suitability of the classification scheme outside the context of PISA items.

References

- Geiger, V., Goos, M., & Forgasz, H. (2015). A rich interpretation of numeracy for the 21st century: a survey of the state of the field. *ZDM-Mathematics Education*, 47(4), 531-548. doi:10.1007/s11858-015-0708-1
- Niss, M., & Højgaard, T. (2019). Mathematical competencies revisited. *Educational Studies in Mathematics*, 102(1), 9-28.
- Turner, R., Blum, W., & Niss, M. (2015). Using competencies to explain mathematical item demand: A work in progress. In K. Stacey, & R. Turner (Eds.), *Assessing mathematical literacy: The PISA experience* (pp. 85-115). Springer.