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► **To cite this version:**

Marie Therese Farrugia. The creation of a bilingual glossary of mathematics terms. Paul Drijvers; Csaba Csapodi; Hanna Palmér; Katalin Gosztonyi; Eszter Kónya. Thirteenth Congress of the European Society for Research in Mathematics Education (CERME13), Jul 2023, Budapest, Hungary. Alfréd Rényi Institute of Mathematics; ERME, Proceedings of the Thirteenth Congress of the European Society for Research in Mathematics Education (CERME13), TWG9 (9). hal-04393026

HAL Id: hal-04393026

<https://hal.science/hal-04393026>

Submitted on 19 Jan 2024

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The creation of a bilingual glossary of mathematics terms

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Keywords: Bilingual mathematics education, mathematics register, early and primary mathematics.

Background

In Maltese classrooms, it is a common practice to teach mathematics through translanguaging with Maltese and English. The use of English in education is a legacy of British colonial rule (1800-1964). A number of subjects, including mathematics, continue to be taught through textbooks published in English, and class-, and school-based assessments, together with national examinations are carried out in English. However, as stated by Camilleri-Grima (2018), although reading and writing generally take place in English for many subjects, Maltese is used a lot in spoken interaction.

The idea of having mathematics written texts in Maltese has, at times, been floated in the educational sphere. In 2019, the *National Literacy Agency* drew up a sample bilingual mathematics examination paper for Grade 4 level (age 9). The paper was piloted in some volunteering schools, albeit not under examination conditions. However, although the Maltese language offers a rich pool of mathematics-related words, there does not exist an *established* academic mathematics register (Halliday, 1978). Consequently, and prompted by the afore-mentioned examination paper initiative, the Ministry for Education set up a working group to draw up a comprehensive bilingual glossary of mathematics terms for early childhood and primary grades (ages 3–11)¹. The initial purpose of the glossary was to provide an established base of vocabulary in the event that the examination-paper project were to be continued. However, the exercise soon took on a much broader ambition. The rationale of the document states that the glossary will: “Support teachers as they focus on mathematical concepts and processes, and help them bring out nuances of meaning; Provide teacher and learners with Maltese versions of the terminology, should these be required as part of the educational process; Encourage consistency across class / school contexts with regard to mathematical terms, for both English and Maltese in the spoken and written form; Highlight the terminology one might expect to use in teaching and learning resources, and in the assessment of mathematics” (Farrugia et al., 2022, p. 8).

Theoretical underpinnings

Cummins (2021) proposes a *Crosslinguistic Translanguaging Theory (CTT)*. This holds that bilinguals speak distinguishable languages, involving multiple registers and that effective teaching promotes translanguaging involving conceptual and linguistic transfer across languages. This perspective is in contrast with the ‘unitary’ model of translanguaging which claims that a multilingual’s linguistic system is internally undifferentiated (García, 2009). The underlying

¹ The four-person working group is comprised of myself as Chairperson (mathematics educator and researcher, University of Malta); Melanie Casha-Sammut (Director, STEM and VET programmes, Ministry for Education); David Muscat (Maltese language specialist and CEO, *National Literacy Agency*), Lara Ann Vella (applied linguist and researcher within the *National Literacy Agency’s* Language Policy in Education Unit).

assumption of the *Bilingual Glossary* is CCT, that is, we assume that the discrete languages Maltese and English exist. The compiled vocabulary relates to the respective mathematics registers.

Developing the glossary

When compiling the Maltese words, we considered existing classroom practices, and the necessity of words to capture nuances of meaning and to ‘sound right’. Examples of how Maltese words were chosen include: identifying the Maltese equivalent, applying an ‘everyday’ Maltese word to mathematics, creating a new word in line with existing Maltese word formation processes, assimilating an English word into Maltese and retaining a word in English. With respect to the latter two choices, we followed guidelines issued by *Il-Kunsill Nazzjonali tal-Ilsien Malti* (*The National Council for the Maltese Language*) (2018), which govern how words imported from English should be assimilated into written Maltese. Occasionally, we recommended two Maltese synonyms or variants for one English word. After the completion of a number of curricular topics, a draft document was launched for public consultation in July 2023; feedback was taken into consideration as the work on the glossary continued.

Potential research

While a number of educators doubted the usefulness of the Maltese terminology, due to the prevalent use of English in their own classrooms, another number of educators welcomed and praised the initiative, believing that it will be very useful to them and their students. It is anticipated that collaborative research will be carried out with teachers in the latter group. Research questions that can be addressed are: *Why do teachers consider the Bilingual Glossary to be a potentially useful tool? How can Maltese be used to support the learning of mathematics? What role can Maltese play in a language-responsive approach to the teaching and learning of mathematics? For which students might Maltese be helpful? And why?*

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