

Identifying and Developing Mathematics in Australian Indigenous Languages: A Functional Typological Approach

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This presentation reports on the design of and initial stages of a project which aims to improve the mathematical learning of Indigenous language speaking students by delivering mathematics education in Australian Indigenous languages. This project is investigating how the language structures needed for school mathematics occur in Indigenous Australian languages in order to guidelines to assist schools to initiate or extend mathematics programs in Australian Indigenous languages. It will add to what is known about the variation in how languages are and can be used mathematically from a systematic cross-linguistic perspective.

The core of the project is three typologically diverse case studies at three sites: Areyonga School (Pitjantjatjara), Groote Eylandt Bickerton Island Primary College Aboriginal Corporation (Anindilyakwa) and Murrupurtiyanuwu Catholic Primary School (Tiwi), which have past or current history of Indigenous Australian language mathematics programs. Their diverse linguistic and cultural environments address a theoretical focus on diversity. Collaborating with Indigenous educators and elders, the project will develop a learning progression, assessment tools and sequence of mathematics lessons in each language. This will be iteratively investigated and refined throughout each case study.

This project is applying a novel functional typological approach to the identification and development of diverse languages for mathematics teaching and learning (Edmonds-Wathen, 2019). Typology is a field of linguistics which aims to compare and describe languages in a framework-neutral manner (Nichols, 2007), hence enabling languages to be contrasted on equal terms, rather than from analytic perspectives that privilege one language over another. A functional typological approach to mathematics register development thus takes mathematics as the semantic and functional field of interest (Edmonds-Wathen, 2019).

The chosen initial foci are foundational logical reasoning, classification, and spatial concepts (such as identification of similarity and difference and ways of describing roundness or straightness). As tasks and tools will be developed collaboratively at each site, they will vary and be specifically contextualized. For example, the environment surrounding Areyonga is full of geometrical shapes in the form of rocks that fall from the highly stratified escarpments and rockhills. The language of geometrical shapes developed thus far in Pitjantjatjara therefore draws on that used to describe rocks and stone artefacts, and the body, which people metaphorically extend to describe the anatomy of geographical features. A triangle is a *kanti*—a triangular quartz piece traditionally used as a blade. Rockhills are described as having a *mulya* ‘nose’ where a ridge ends and slopes downwards. The *kanti* ‘triangle’ therefore has *mulya mankurpa* ‘three noses’, or three corners. This presentation includes early data on language development work, the design of initial lessons and, from Areyonga, their implementation in the classroom.

References

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