

## Using home languages as a resource to enhance statistical thinking in a multicultural classroom

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### Intro / Project description

The language of statistics can be challenging. Even more so in English medium classrooms for English second language learners who must simultaneously learn English and statistical English and be able to negotiate between these two. This collaborative project researched the use of home languages as a resource for multilingual students in learning statistical probability over two cycles of design research in two multicultural Year-9 classes. A teaching sequence for probability thinking that incorporated culturally responsive resources was developed and refined over the two cycles. Findings illustrate the potential of translanguaging to support diverse learners of statistics.

### Aims

Our design-based collaborative study aimed to extend our understanding of the language and cultural challenges and productive possibilities students experience when learning about probability through specially designed teaching sequences that use context, culture and language-as-a-resource.

The following **research question** guided the study:

- How do multilingual Year 9 students negotiate communication in small-group and whole-class settings when working on probability tasks?
- How might teachers draw on home languages, contexts and cultural experiences to enhance the probability understanding of multilingual students?

### Why is this research important?

It is well known that the language of mathematics and statistics, which is the focus of this study, poses challenges to English second language students. The teaching language as resource practices and cultural resources trialed in our study will help advance students' understanding of probability.

### Key findings

- Cultural games played an important role in learning probability in the classroom. Games provided opportunities for students to work in groups in a fun learning environment.
- Using language as resource considerations such as Home Language and non-linguistic cues created opportunities for students to develop deeper understanding of probability concepts.
- Students' ability to communicate and negotiate their thinking in group and whole-class settings using statistical language and home language was enhanced, both verbally and in writing.
- Teacher practices such as modelling, reading, and writing, and collaborative learning facilitated student statistics learning and language development.
- The teachers benefited by having increased understanding of statistical content and culturally responsive pedagogy, increased confidence in their ability to address language challenges and opportunities to learn from each other.

### Implications for practice

The three teachers in the study used a variety of linguistic strategies that qualify as translanguaging during their probability teaching. Teachers can use these strategies to help student to make sense of the content and to elicit students' thinking but not necessarily to support students' first language.

Gestures and language modes can complement each other and be used together as resources for mediating and scaffolding teaching and learning. They need to be thought of as a single system that is larger than either of them when considered separately.

As language is the main medium through which mathematics/statistics teaching and learning takes place, mathematics teachers may need access to professional development opportunities (at both pre- and in-service levels) which clarify how academic language works in the mathematics classroom. They could be encouraged to give all students access to high levels of mathematical challenge to make mathematics teaching and learning more inclusive.

This research will be of interest to the international community since it involves looking at issues that are relevant for schools in English speaking nations worldwide. Teachers may need to re-evaluate their teaching practices, especially if part of their population is learning English as a second language. These learners may require targeted, explicit, and intensive instruction in the complex and specialized language that lies at the heart of statistics content area.

The teaching sequence developed within the study provides an empirically grounded example that other teachers can adapt to their local circumstances. Findings on language-based strategies have the potential to be used in other school subjects such as science and in other multicultural contexts.

Although NZ is multilingual, many classroom teachers are monolingual and/or do not have experience in or strategies for working with children whose home language is not English. Initial Teacher Education providers will be interested in this research. Understanding the challenges teachers face in the classroom when teaching statistics to learners with a range of languages and language proficiencies will assist teacher education institutions to better equip teachers for a multicultural classroom.

### Our partners:

This research project was a collaborative partnership between The University of Waikato and De La Salle College. Sashi Sharma who is an Associate Professor at the Division of Education, University of Waikato was the principal investigator for the project. Phil Doyle, Deputy Principal of De La Salle College provided onsite leadership and mentoring for the two teachers (Daniel Kumar and Louis Marcelo). He acted as a critical friend for Sashi in the research process to ensure that it was responsive to the school context and built on developments in an ongoing manner. The teachers co-planned and taught the project teaching sequences, participated in data collection and analysis. They played a vital role in the dissemination of findings.

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