

Why should we argue about the process if the outcome is the same? When communicational breaches remain unresolved

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What constitutes proof and proving at the primary level continues to be debated and there is little research that explores how young students' arguments develop and become accepted within the classroom community. In this paper I utilise Sfard's (2008) *commognitive framework* to provide insights into how young students' arguments unfold as they *substantiate*—verify with evidence to prove why a statement is mathematically correct—their classifications of numbers as even or odd.

According to the commognitive framework, learning occurs through the learner's exposure to, and participation in, mathematical discourse that they are supposed to individualise. This process can happen with the support from other learners. Breaches in communication, whereby interlocutors use the same mathematical signifiers (words or written symbols) in different ways, or perform the same mathematical tasks according to differing rules, have an indispensable role—they provide space for participants to consider new ways of communicating as they work towards resolving their differences. Accordingly, I explore the sources of communicational breaches in the context of a group of four primary school students in New Zealand (aged 8- and 9-years old) classifying odd and even numbers. Specifically, I examine whether and how their breaches in communication give rise to a modification in their discourses.

Commognitive discourse analysis was undertaken to look for well-defined, repetitive patterns (routines) in students' discourses regarding their uses of the words 'odd' and 'even' and their corresponding substantiations about oddness and evenness. A new methodological tool was introduced to document and trace consistent and inconsistent uses of the words within the group. The findings show that students attended to different features of oddness and evenness which enabled them to agree on *which* numbers are odd and even (the outcome) while disagreeing on *why* (the substantiation process). The students' unwillingness to build on one another's ideas or reach a communicational agreement that rationalised the group decisions was attributed to them seeing no incentive to do so because their different processes yielded the same outcome.

The findings highlight the role that proving can play in signalling differences in reasoning within a group of students that may otherwise remain hidden. They also suggest that students' awareness of a breach in communication may not always be sufficient to engender a genuine engagement targeted at the resolution of a breach, even when pedagogical moves toward this direction are made.

References

- Sfard, A. (2008). *Thinking as communicating: Human development, the growth of discourses, and mathematizing*. Cambridge, UK: Cambridge University Press.