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From fraction to ratio : Exploring the features of f irst-year s tudents ’ percent discourse

Luksmidas, Jaqueline Marques

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ABSTRACT

Percent is a familiar, yet complex topic that is found to be difficult for both adults and children. The question of why percent has been persistently difficult has spurred much research, the most notable of which was conducted in the early 1990's. Those studies have adopted a cognitive perspective. This study adds a *commognitive* perspective to the discussion by proposing a model for the development of percent discourse (PD-Model). The model rests on Sfard's premise that learning mathematics is synonymous with modifying and extending one's discourse.

I begin by employing a cognitive framework of percent for the design of written tests to identify the areas of percent that first-year university students experience difficulty with. The quantitative analysis of the written tests shows that less than half the students obtained a score of 50% or more. Later, in search of the features of students' discourse that hinder their access to percent discourse, I examine the discourse of two pairs of students in interview sessions. I illustrate the application of the PD-Model as an interpretive analytical tool that offers an explanation for the insufficiency in their objectification of percent as a comparative ratio.

This study confirms the results of Parker's (1994) study, that is: percent is difficult for students to work with. The key findings of the discursive analysis show that students' discourse of percent is narrow and deeply rooted in a percent-as-fraction notion. The students' discourse is predominantly additive in nature and does not show signs of recognising the underlying multiplicative structures of percent tasks. As such, a fully-fledged objectification of percent as a comparative ratio is not evident in the students' discourse of percent.

Keywords: Commognition, mathematical discourse, percent.