USE OF A COMPETENCE MODEL TO DESCRIBE STUDENTS' UNDERSTANDING OF CONCEPTS RELATED TO IMPROPER INTEGRATION[1]

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Improper integrals constitute a concept of great utility for Mathematics degree students. However, it appears that students are unable to assimilate this concept within the wider system of concepts they learn in their first year of Mathematics studies. In this oral communication we describe a competence model used in a preliminary and exploratory study of the kind of understanding students possess about improper integral calculus when two registers of representation come into play. We understand competence to be the coherent articulation of different semiotic registers: to be competent in mathematics is to be able to articulate coherently the different representations of a mathematical concept when having to solve "non routine" problems. According to us, the evaluation of our students' knowledge means that this should be analysed on the basis of activities that aim to clarify possible connections (articulations) made by them while constructing a given concept. In order to design our competence model we adapted different stages of development noted in cognitive representation systems in the case of algebraic language (Socas, 2001) to our own concept. After analysing the results to a questionnaire, six students were selected to be interviewed on the basis of their overall results and the significance of some of their answers. The main difficulties we detected are due to the lack of meaning or of knowledge of previous concepts. We can also see that, although some of our students have managed to make representations in the graphic register to some extent, going from graphic to the algebraic remains more difficult than going from the algebraic to the graphic. We will also discuss the formal competence model used.

- Socas, M. (2001), *Investigación en Didáctica de la Matemática vía Modelos de Competencia. Un estudio en relación con el Lenguaje Algebraico* (unpublished work), Departamento de Análisis Matemático, Universidad de La Laguna.

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