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A didactic problem around the elementary differential calculus and functional modelling

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This work is part of a PhD thesis in the field of the Anthropological Theory of the Didactic: “Se propone un modelo epistemológico de referencia (MER) del cálculo diferencial elemental (CDE) alternativo al modelo dominante en el sistema escolar.” It proposes an alternative reference epistemological model to the dominant model of elementary differential calculus (EDC) for Secondary school systems. We assume that its rationale arises in the context of functional modelling (FM).

Keywords: Calculus, modeling, anthropological theory of the didactic, dimensions of a didactical problem.

The didactic problem approached will be here characterized by three fundamental dimensions: *epistemological, economic and ecological* (Gascón, 2011):

EPISTEMOLOGICAL DIMENSION

What is the rationale of EDC in the transition secondary school-university?

How to interpret and describe EDC linked to FM?

The *Activity Diagram* of the FM constitutes the basis for answering these questions (Figure 1).

ECONOMIC DIMENSION

How is EDC organized and managed in the Portuguese educational system? What is the rationale currently assigned to it? Which were the transpositives changes (Chevallard, 1985) suffered by its role in the FM activity to pass from the scientific community to the education system?

Some answers to these questions emerged from an historical evolution analysis of the EDC role in the

Portuguese curriculum and the potential relationship FM-EDC. So, we characterized the EDC ‘official’ rationale in secondary-university as a way to study isolated functions with a weak connection to FM.

ECOLOGICAL DIMENSION

What conditions are needed to develop functional modelling in the transition secondary-university? *Dimensión ecológica:* What role could play the EDC to establish these conditions? What restrictions could hinder its development?

To partially answer these issues a *study and research path* (Chevallard, 2009) was designed and experimented, on the basis of a part of the proposed reference epistemological model.

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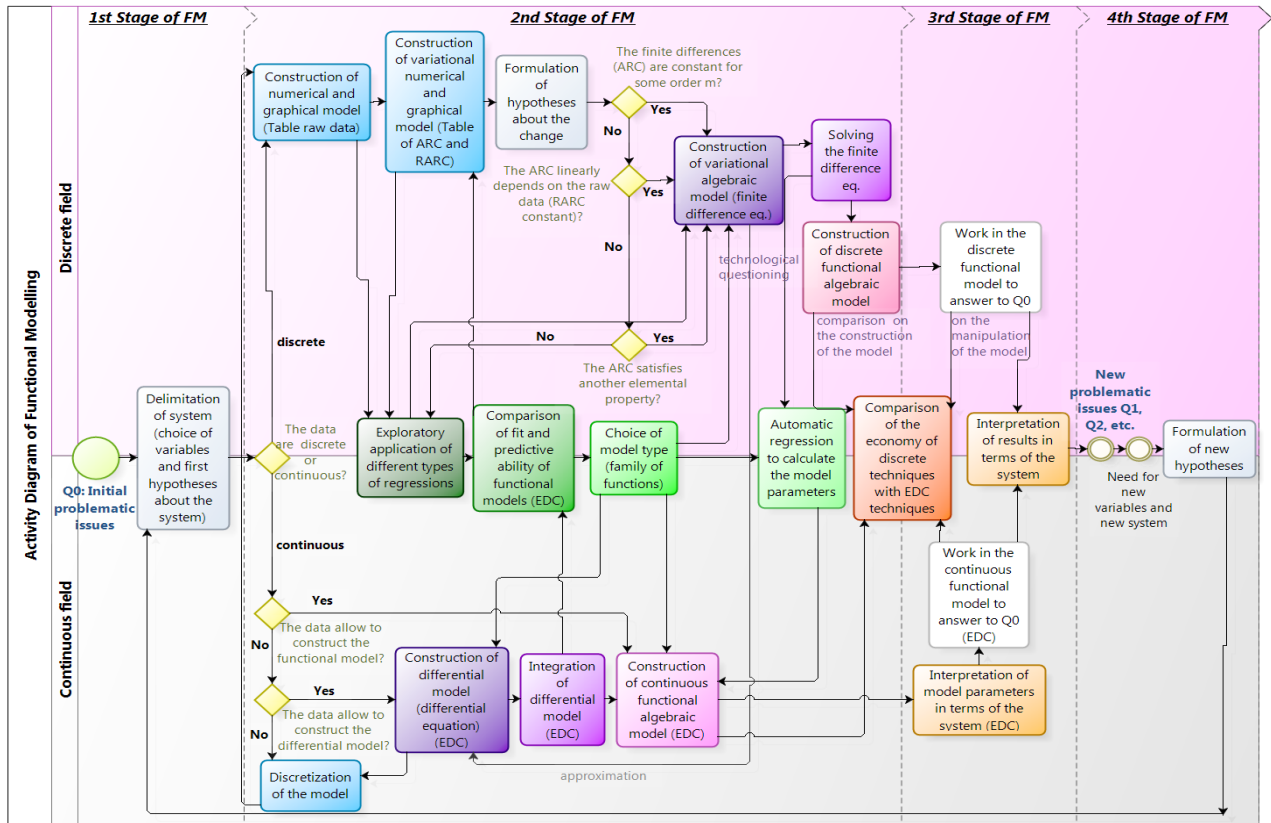


Figure 1: Activity diagram of functional modelling

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