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Didactic engineering as a research methodology: from fundamental situations to study and research paths.

Watson, Anne (ed.) et al., Task design in mathematics education. An ICMI study 22. Based on the conference, Oxford, UK, July 2013. Cham: Springer (ISBN 978-3-319-09628-5/hbk; 978-3-319-09629-2/ebook). New ICMI Study Series, 249-272 (2015).

Summary: We assume that task design-based research refers to any research that is experimentally based on an educational context and pays special attention to the description, analysis, and organization of the content to be taught (the "task" in the expression "task design"). This chapter focuses on the field of didactics of mathematics as it emerged in the middle of the 1970s with the works of the French researcher *G. Brousseau* [Theory of didactical situations in mathematics: didactique des mathématiques, 1970–1990. Dordrecht: Kluwer (1997; ME 1998a.00152)]. The notion of didactic engineering was used early in this field to define the relationships between the theoretical developments of didactics and the empirical reality of the classrooms. It can be presented as a research methodology structured in distinct intertwined phases with the double aim of studying didactic phenomena and developing new educational proposals. We are illustrating this methodology by means of two examples: the measure of quantities at primary school and the modeling of a population growth at university level. The first one is taken from the theory of didactic situations which is at the origin of didactics as a scientific discipline; the second one corresponds to an evolved conception of didactic engineering within the anthropological theory of the didactic.

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