



MATHEMATICS
EDUCATION

How to solve it?

Szeged, Hungary, August 3-7, 2016

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EDITORS: CSABA CSÍKOS • ATTILA RAUSCH • JUDIT SZITÁNYI

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Mathematics Education:
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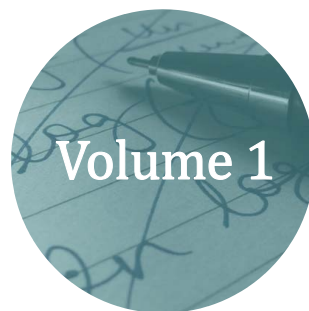
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COGNITIVE CONFIGURATION SOLVING ANTIDERIVATIVES

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The objective of this study is to identify and characterize the meanings that civil engineering students from two countries (Mexico and Colombia) mobilize in their mathematical practices on antiderivatives. For the purpose of evaluating the understanding of the antiderivative, a questionnaire was designed, which gathers three elements: 1) the use of diverse meanings of the antiderivative, 2) diversity of representations and 3) the mathematical relationship between the antiderivative and other mathematical objects. The Onto-semiotic Approach (OSA) to mathematical cognition and instruction (Godino, Batanero & Font, 2007) was the theoretical model set to analyze the students' answers. This model provided us with 'theoretical and methodological tools' that allowed to describe in a systematic way, the students' mathematical practices as well as the elements, and their meanings, regarding the *cognitive configuration* associated with such practices (i.e., linguistic elements, concept/definitions, propositions/properties, procedures and arguments).

As a result of this study, some relevant aspects of the community of engineering students' mathematical knowledge of the antiderivative were highlighted, for example, that the partial meaning of the antiderivative fluxions-fluents (Gordillo & Pino-Fan, *in press*) was one of the most activated meanings in their mathematical practices. On the other hand, the engineering students' deficiencies of mathematical knowledge were also evident through the questionnaire and justify the pertinence of designing specific formative actions to facilitate the understanding of the antiderivative for engineering students. Such formative actions should consider the complexity of the holistic meaning as well as the diversity of representations for this mathematical object.

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