

## Editorial

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This issue of *ZDM – The International Journal on Mathematics Education* on “The Teaching and Learning of Calculus - in memoriam Arnold Kirsch” is dedicated to Arnold Kirsch, who passed away on October 14, 2013.

Arnold Kirsch was one of the most influential German mathematics educators ever. His ground-breaking talk at the 3rd International Congress on Mathematical Education (ICME-3), which took place in 1976 in Karlsruhe, on “Aspects of Simplification in Mathematics Education”, has influenced generations of German-speaking mathematics educators. His approach of “simplification as the process of making accessible” (Kirsch 1977, p. 98) was an important source and the basis for the development of the subject-related didactics of mathematics (so-called “Stoffdidaktik”), an important strand of the German language discussion on mathematics education.

Important parts of Arnold Kirsch’s work relate to the teaching and learning of calculus at various levels at school. His plea to develop approaches to the teaching and learning of calculus at school which make calculus accessible for most students at upper secondary level, and leads to a real understanding of this topic area, led to many interesting examples and reflections on calculus teaching in Germany at that time and thereafter. In memory of Arnold Kirsch, Werner Blum has translated one of his widely discussed proposals for a genuine understanding of the

(first) Fundamental Theorem of Calculus by referring to basic ideas (so-called “Grundvorstellungen”) of the derivative and the integral (Kirsch 2014). In an accompanying commentary, Werner Blum reflects on Arnold Kirsch as a mathematics educator and on his achievements in mathematics education (Blum 2014).

The ideas of Arnold Kirsch on calculus teaching, especially his strong emphasis on a sound visual understanding and on connections to the real-world meanings of calculus, can be found in a further developed way nowadays in many papers on calculus teaching. These studies have matured independently of Arnold Kirsch’s contributions, because his work is mainly published in German and therefore not widely known in the international mathematics education debate. However, this shows the high potential and novelty of his ideas, which are still interesting for the current debate, although his ideas are of course strongly tied to the context of their development.

Arnold Kirsch had a close relationship with *ZDM*: he served for several years as a member of the advisory board of the *Zentralblatt für Didaktik der Mathematik*, the original title of *ZDM – The International Journal on Mathematics Education*, until 2007, and he promoted *ZDM* widely. It is therefore very appropriate to devote this issue to him.

Personally I owe Arnold Kirsch a lot: he was one of my PhD reviewers and I had therefore the privilege to share my PhD thesis with him. He was always a hard critic, in particular questioning any claims that were not well justified. It was a pleasure and an honour to have had the chance to meet him and to work with him. I hope that the readership of *ZDM* will understand, while reading the papers in this issue, how much the German-speaking mathematics education community owes Arnold Kirsch.

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I thank the guest editors Chris Rasmussen and Marcelo C. Borba for their willingness to enable me to share my deep respect for Arnold Kirsch. I am certain that this issue on the teaching and learning of calculus connecting theoretical reflections with empirical studies would have pleased him.

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(Editor-in-Chief of ZDM)

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