WHAT'S THE USE OF SCIENCE? SCIENTIFIC CONTEXTS IN TEXTBOOKS PROBLEMS

François Lagacé, Jean-François Maheux
Université du Québec à Montréal

Mathematical concepts, especially in high school textbooks, are commonly approach referring to scientific phenomena for the "concreteness and usefulness" they provide to mathematical ideas (e.g. Bossé et al., 2010). But what is science's contribution in mathematics problems? In this poster, we present details of our textbooks analysis and considerations regarding mathematics teachers' scientific preparation.

Analyzing mathematics textbooks recently published in Quebec (Canada) reveals an increasing presence of scientific concepts as we progress through high school. Examining 12 textbooks, the proportion of such problems is about 15%. Scientific phenomena are thus significantly present on the quantitative side (reaching up to nearly 100% when considering only "context problems" in the chapters on vectors or functions). Concerning the *qualitative* aspect of this representation, our analysis leads to the observation of numerous *inadequacies*, from a scientific perspective, in the presentation of those notions: In many cases, the science behind the problem is incorrect. One example is a problem involving fireworks trajectories, inaccurately described as parabolas. This raises questions, especially in regard with the *scientific* preparation of mathematics teachers (e.g. Koirala & Bowman, 2003) who eventually have to use these problems: Is scientific inadequacy in mathematics textbooks an important issue? Should we prepare teachers to deal with it? What orientation could we take in this preparation? To investigate these questions, we began conceptualizing the *relations* between scientific phenomena and mathematical concepts in regard with the possible use of textbooks problems involving both. We found that, epistemologically speaking, the relation between scientific phenomena and mathematical concepts is far from obvious (e.g. Einstein, 1926). Notions such as modelization, mathematization, representation or application allude to different understandings of those relations along the (trans-)disciplinarity spectrum. Presenting those perspectives and some examples, we offer to discuss the concept of *conceivability* as a way to "get around" problems involving scientific concepts, somehow regardless of their scientific inadequacies.

References

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