

Repeated Errors and Persistent Misconceptions in Science and its Teaching

Semjon Adlaj

Abstract. The necessity of exposing errors made “at every step” by “renowned” mathematicians was emphasized by Nikolai Vavilov (September 17, 1952 – September 14, 2023) at his July 25, 2023 talk at the III CAM Conference. He informally categorized errors as “bad,” stemming from conceptual misunderstanding, and “good,” not impacting “the result” and arising upon expressing an intermediate concept “too well” understood.

Exposing errors is both essential and highly instructive in Science Teaching, where no widely accepted authority needs be personally accepted without much scrutiny. Many “bad” errors persist, becoming a “stable” source of many misconceptions that repeatedly find their way into “approved” contemporary science textbooks and “authoritative” internet sources. Such errors cannot be eliminated without highly professional and systematically continuous educational effort. This effort is no less continuously undermined by a too widely spread approach based on the false premise that errors might be concealed, minimized, or (stubbornly) ignored. This dishonest and unprofessional approach cannot be accepted as an “alternative” approach to education because it not only precludes progress but is regressive and ultimately detrimental. We shall also provide a concrete educational concept, offering a shining example of computer-assisted mathematics in support of the former Minister (of Education and Science) Olga Vasilieva’s well-targeted 2016 initiative to refurbish the world’s best school education.

Semjon Adlaj

A. A. Dorodnicyn Computing Centre of the Russian Academy of Sciences

Moscow, Russia

e-mail: semjonadlaj@gmail.com