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**Peter A Loeb\*** (loeb@math.uiuc.edu), Department of Mathematics, University of Illinois, 1409 West Green Street, Urbana, IL 61801. *Calculus: A Missed Opportunity*.

The principles of real analysis, an important part of mathematical culture, should play a major role in generating the impact of a freshman education. As many students pass through our hands, however, we miss this opportunity by teaching courses that continue the principle of high school mathematics: "Shut up and calculate". This diminution in intellectual content is unnecessary since a few changes to the usual approach produce a simpler, more complete and satisfactory explanation of what's going on.

At the beginning, rather than general limits, one can first introduce functions having a zero limit of the output as the input tends to zero. This is the easiest limit to explain, and, as we shall show in the talk, all other limits in the course are applications. In particular, the necessary aspect of uniform continuity can be explained at the appropriate level in terms of such limits, and the Riemann integral can be defined using such a limit. Moreover, while upper and lower Riemann sums fail to justify the use of the integral for many simple applications, a general justification can be given in terms of these simple limits. (Received August 29, 2011)