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Do theorems admit exceptions? Solid findings in mathematics education on empirical proof schemes.

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From the text: One of the goals of teaching mathematics is to communicate the purpose and nature of mathematical proof. *H. N. Jahnke* [ZDM 40, No. 3, 363-371 (2008; ME 2009f.00383)] pointed out that, in everyday thinking, the domain of objects to which a general statement refers is not completely and definitely determined. Thus the very notion of a “universally valid statement” is not as obvious as it might seem. The phenomenon of a statement with an indefinite domain of reference can also be found in the history of mathematics when authors speak of “theorems that admit exceptions”. This discrepancy between everyday thinking and mathematical thinking lies at the origin of problems that many mathematics teachers encounter in their classrooms when dealing with a universal claim and its proof. The solid finding (the term “solid finding” was explained in the previous issue of this newsletter) to be discussed in this article emerged from results of many empirical studies on students’ conceptions of proof. In a simplified formulation, the finding is that many students provide examples when asked to prove a universal statement. Here we elaborate on this phenomenon.

Classification: E50

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