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Conditions for proving by mathematical induction to be explanatory.

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Summary: In this paper we consider *proving* to be the activity in search for a proof, whereby *proof* is the final product of this activity that meets certain criteria. Although there has been considerable research attention on the functions of proof (e.g., explanation), there has been less explicit attention in the literature on those same functions arising in the proving process. Our aim is to identify conditions for proving by mathematical induction to be explanatory for the prover. To identify such conditions, we analyze videos of undergraduate mathematics students working on specially designed problems. Specifically, we examine the role played by: the problem formulation, students' experience with the utility of examples in proving, and students' ability to recognize and apply mathematical induction as an appropriate method in their explorations. We conclude that particular combinations of these aspects make it more likely that proving by induction will be explanatory for the prover.

Classification: E55

Keywords: college/university mathematics; examples; explanation; proof by mathematical induction; problem design; proving

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