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Nim, Human Learning, and Teaching Mathematics

About 25 years ago, psychologists began to seriously discuss the possibility that there are two basic forms of learning. The first, associative learning, is context specific and implicit. People often can not describe what they have learned. The second, rule-based or cognitive learning, generalizes across contexts and can be explained by the learner. These two forms of learning were embedded in a computational model in an attempt to account for individual differences in the manner people learn to play Nim, a token game. The version studied involved five rows of counters. None of the participants were able to solve this highly structured problem in 60 games. Most, however, played better as a function of practice. The fit of the computational model was improved by adding rules that people might use to conceptualize or structure the problem before they acquired information about specific moves. To the extent that imposing structure, associative learning and rule-based learning characterize human problem solving, they are relevant to the learning of mathematics. The relationships between learning to play Nim, problem solving, and teaching mathematics are explored.