## MBS 95-05

Comments on Mathematical and Logical Aspects of a Model of Knowledge Acquisition Behavior Josh Stern and Kamakshi Lakshminarayan

We review the Stochastic Learning Path model (SLP) proposed in Falmagne (1993) and show that almost every choice for the free parameters of this model leads to an inconsistent mathematical specification. As a result, the version of SLP that is axiomatized in that paper does not describe a class of stochastic processes and could not be used to model data. We initially suggest two alternative version of the SLP model that rectify this problem. One of our proposals slightly modifies, extends, and complements the "Basic axioms" of Falmagne (1993), showing that the processes that are compatible with these can be easily understood as mixtures of finite-state, continuous time, Markov birth processes. A second proposal satisfies an objective of Falmagne (1993): to re-describe the Stochastic Learning Theory of Falmagne (1989) in the form of a stochastic process. We also define and motivate a pair of semantic consistency conditions that apply to a wide class of 'SLP-type' models and show that both of our attempts to define consistent versions of the SLP model fail to satisfy both of these conditions. We then describe a third version of SLP that satisfies one of these consistency conditions and show that the other condition cannot be satisfied by any 'SLP-type' model.