## PLM Progress Report 6: Inventing tutorial dialogs to improve science learning

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This talk describes the process of developing and assessing spoken dialogs to improve science learning by elementary school children. Third, fourth and fifth grade students in our study learn science through classroom science investigation using FOSS (Full Option Science System). While students in schools that use the FOSS program improve their science achievement by up to 20%, many students do not achieve proficiency on standardized tests, especially in low performing schools. The goal of our study is to design tutoring dialogs that assess what a student knows and doesn't know about the science concepts they are learning, and guide them through a process of thinking and reasoning to construct accurate mental models that enable the student to explain and predict scientific phenomena. Once these dialogs have been designed and refined in our laboratory by a team of science education researchers and teachers, data collected from tutoring sessions are used to develop spoken dialog systems in which a virtual tutor-- a lifelike computer character-- engages students in dialogs that closely emulate those of effective human tutors. The process of developing and assessing spoken dialog systems to improve science learning, from their initial design, to collection and annotation of data in human tutoring sessions, to Wizard of Oz experiments, to field testing and then assessment, which compares science learning in classroom control, human tutoring and virtual tutoring conditions, will be described.