Teaching our children well: what Oregon teachers have learned after six years of system dynamics instruction at the K-12 level.

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Since receiving two consecutive grants from the National Science Foundation, CC-STADUS (1993-1996)/CC-SUSTAIN (1997-2000) has trained over 160 teachers who have now presented system dynamics to over 18,000 students. We were careful as we chose participants, seeking not only knowledgeable people but also good teachers. If this experiment were to work, it was imperative that committed, introspective teachers pay attention to their new ideas: not just how the subject matter might succeed, but also how the pedagogy would make it work. Now, after six years of concerted effort in a variety of school populations, and across the curricular spectrum, we are able to identify a handful of efficacious methods.

Working through a systems¹ problem asks a substantial amount of a student¹s time: some must be in contemplation, wherein the student examines a problem privately and makes initial forays; and some in collaboration, wherein groups of students, through team effort, exhaust a problem¹s breadth through model construction. Students who use a journal or lab-style notebook and who keep a daily record of model-building notes ‹such things as questions, observations, but most notably their errors‹ retained the most and advanced rapidly. Writing thoughtful, precise papers about their problem and the model construction helped students see a model¹s strengths as well as weaknesses.

Successful teachers used a variety of methods, but their repertoire always included, in varying degrees and at various times, whole-class model construction and criticism, requiring distinct presentation methods of models in various stages of construction, and using local systemic issues as discussion points. These teacher-lead discussions yielded significant growth, as students tested their insights in front of peers as well as adults. A roomful of 17 year olds discussing our metropolitan area¹s Urban Growth Boundary seems also to enjoin Jay Forrester¹s high promise: the aim of system dynamics is to build better societies.