1023-Z1-927   **Clyde L. Greeno*** (`greeno@mathsense.org`). *Navigational Mathematics Instructology: A Scientific Scholarship Of Teaching And Learning.* Preliminary report.

Especially in mathematics, the escalating SoTL movement includes the gradual advent of a science of learning and instruction – a SCIENTIFIC MATHEMATICS INSTRUCTOLOGY. The structural nature of the instructional guidance of mathematical learning is effectively portrayed by a game-theoretic "navigational" model that teachers can directly apply for improving personal instructional practices.

Topologically, the "learning space" consists of "mathematical points" which might be learned. The "learner" is a time-indexed progression of developmental states, each of which is a subset of the space. Those states constitute a developmentally-continuous progress-path of personal mathematical growth. In humans, the state-transition growth is governed by natural, psycho-mathematical laws of personal mathematical comprehension — known to some as "mathematical reasoning", and to students, as "common sense".

The "navigational" function of mathematics instruction is to select a goal-state, and to guide the learner's progress-path to transit in that direction. The "game" is about making best-choice instructional decisions about when, and how to intervene—so that the "course" is maximally common-sensible to the learner. The optimal research "laboratory" is the mathematical-learning clinic. (Received September 23, 2006)