

**ZMATH 2012b.00243**

**Goldstone, Robert L.; Wilensky, Uri**

**Promoting transfer by grounding complex systems principles.**

J. Learn. Sci. 17, No. 4, 465-516 (2008).

Summary: Understanding scientific phenomena in terms of complex systems principles is both scientifically and pedagogically important. Situations from different disciplines of science are often governed by the same principle, and so promoting knowledge transfer across disciplines makes valuable cross-fertilization and scientific unification possible. Although evidence for this kind of transfer has historically been controversial, experiments and observations of students suggest pedagogical methods for promoting transfer of complex systems principles. One powerful strategy is for students to actively interpret the elements and interactions of perceptually grounded scenarios. Such interpretation can be facilitated through the presentation of a situation alongside a description of how the agents in the situation are behaving, and by students exploring and constructing computational models of the situation. The resulting knowledge can be both concretely grounded yet highly perspective dependent and generalizable. We discuss methods for coordinating computational and mental models of complex systems, the roles of idealization and concreteness in fostering understanding and generalization, and other complementary theoretical approaches to achieving transfer.

*Classification:* C30 D20

*Keywords:* educational technology; knowledge level; communication (thought transfer); transfer of training; scientific concepts; interdisciplinary approach; models; research; transfer of training; complex systems; simulation; formalisms; transportable knowledge; situated learning; interdisciplinary approach; cognitive psychology