

Systemic Change: Get Ready, SET, Go! – Where?

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Many well-intentioned people want to improve education. So do we. We believe that education could be far more effective, efficient and satisfying than it is in our current educational systems – not only K-12, but higher education as well.

The question is, “Change what?”

As an analogy, consider an old bridge that is failing – it is structurally weak and is impeding the flow of traffic. If the bridge is not fixed, it will collapse and vehicles will plunge into the river. When engineers design and build a new bridge, they will utilize adequate scientific and praxiological theories – drawing from Newtonian physics, classical mechanics, statics, and structural engineering. No one in modern times would consider building a new bridge by trial and error.

Yet, in education, when we attempt to design new education systems, we are in just this kind of predicament. We want to improve education, but we have no *valid* way of predicting that the new educational systems we design will work any better than what we now have.

Good intentions are not enough. These must be coupled with valid scientific theory of educational systems change – *if we are to succeed* in improving our current systems of education.

We propose the *Get Ready, SET, Go!* change strategy. This is an inquiry-based approach that utilizes *SimEd Technologies (SET)*. The model is outlined below:

- **Phase 1: Get Ready**

- Identify the specific current education system to be improved.
- Over some interval of time, measure changes in system property values with *APT&C*. Analysis of Patterns in Time and Configuration is a methodology for measuring system dynamics and structure.
- Use *PESO* software to predict outcomes based on observed system property value changes. *PESO* is a computer modeling tool based on a well-defined Axiomatic Theory of Intentional Systems (*ATIS*).
- If these outcomes are what are wanted, then do not modify the system. Otherwise, proceed to Phase 2.

- **Phase 2: SET**

- Use *PESO* software to model newly proposed educational systems that are envisioned.
- Identify feasible changes that can be realistically made.
- Run *PESO* predictions far out enough in time to make sure all the consequences of these change strategies would be acceptable. Are these the wanted outcomes? If yes, proceed to Phase 3.

- **Phase 3: Go!**

- Implement change strategy or strategies chosen in Phase 2.
 - Over some interval of time, measure changes in system property values with *APT&C*.
 - Verify that predicted system outcomes have occurred. If not, was something important overlooked in the observation and analysis of this particular system? Proceed to Phase 2.
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SimEd Technologies consist of *APT&C* and *PESO* software programs that are currently under development. *PESO* utilizes Axiomatic Theory of Intentional Systems

(*ATIS*) in order to make predictions. These are briefly explained below with references for further reading.

APT&C is a mixed-mode research methodology and software tool to help create knowledge of education that is directly linked to practice. *APT&C* bridges the gap between traditional linear models in quantitative research and qualitative research findings that lack generalizability. *APT&C* can be used to measure educational system dynamics and structure. See Frick (1990; 2005).

PESO is a software tool for predicting educational systems outcomes. The way *PESO* works is that it makes predictions for a specific educational system, based on current conditions. One must first observe properties of that system and determine how the values of those system properties change over some time period – e.g., increase, decrease, remain constant, increase to some value then decrease, etc. When those changes in system property values are entered into *PESO*, the software finds relevant axioms and theorems which match those conditions, and then executes the logic of the Axiomatic Theory of Intentional Systems. *PESO* effectively applies relevant parts of *ATIS* in order to make predictions of what will happen in the current system based on existing conditions. *ATIS* is a scientific theory which draws from general systems theory, set theory, digraph theory, topological theory, and other theories. Explication of *ATIS* is beyond the scope of this brief report. For further information on *PESO* and *ATIS*, see Thompson (2005), Frick, Thompson and Koh (2005), Frick and Thompson (2004), and the *APT&C* Website (2005).

Work remains to be done before the change strategy we recommend can be utilized in practice. *APT&C*, *PESO* and *ATIS* are currently under development.

Empirical research is needed to validate theorems in *ATIS*. *APT&C* and *PESO* will be powerful tools to facilitate this research. Then *Get Ready, SET, Go!*

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