

Notes on the History and Future of System Dynamics in K-12 Education

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Working in K-12 education to develop Systems Citizens

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Although the national attention is now focused on short-term economic problems, we need to take steps toward a better long-term future. One of those steps will be a major change in how the pre-college, K-12, schools prepare students for the modern complexity of economic and social systems. Many people have deep concerns about failure of the present K-12 education, but most proposals for correction attempt to do still more of what is already not working.

With these notes, I hope to encourage discussion about participating in a daring, difficult, but highly promising kind of K-12 education that is radically different from what is now common.

For more than 20 years, a grassroots movement has been pioneering how to bring an understanding of social and economic dynamics into K-12 education and enhance the critical thinking and problem-solving skills of high school graduates. The result is a total inverting of many of the beliefs that now guide education. The approach is based on the field of “system dynamics” that was created at the Massachusetts Institute of Technology beginning in 1956.

In the broadest sense, system dynamics is a profession that uses computer simulation modeling to show how things change through time. It was originally developed to understand how policies and information flows create the successes and failures of corporations. Later, it was found to be effective in larger social systems, and then as a basis for a new kind of K-12 education.

The enclosed three papers should give a glimpse of the systems approach, why common experience with simple systems and existing education lead to wrong decisions in complex systems, and some stories that have come back from pioneering schools.

The twenty-year pioneering phase, already completed, has been supported by some ten million dollars from three individuals with a lesser amount from me. A dozen or more schools are doing good work and several hundred are doing something. A biennial conference draws 100 to 200 teachers and administrators for papers and discussion on creating a systems education. This systems-based education is already being tested in several other countries.

A small foundation, the Creative Learning Exchange, was funded to conduct the conferences and exchange information among participating schools. More information is available at the web site:
clexchange.org.

A few years ago as part of the initial experimental and development phase, some eight K-12 teachers and six experts in system dynamics met for an intensive week of planning the next 25 years for making a substantial change in precollege education. The future was planned year-by-year to create materials, train teachers, build up a body of system dynamics advisors, and penetrate the school systems. The task is very difficult. We have already found that a school may require more than a decade to make the transition to this new kind of education. In brief, we estimated that in 25 years it should be possible to bring about a third of the schools in the United States into the new mold at a cost of some \$2 billion dollars.

Now, after more than two decades of development, we believe it is time to move forward on a broader scale. The yearly cost of moving forward will expand with time. We estimate that the first ten years of a growing program will require about \$100 million dollars.

It is now time to build an educational system that creates a public that can cope with the challenges of the future.

I invite you to respond with your reactions and questions.

Enclose:

D-4893, Quotations from K-12 Teachers

D-4894, Some Basic Concepts in System Dynamics

D-4895, Learning Through System Dynamics as Preparation for the 21st Century

D3110-13, Forrester Biographical Summary

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