

Computer Simulation

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An introduction is given in the most adequate instrument of research to describe and understand our ever changing world in a quantitative way: computer simulation.

The way computer simulation entered the domain of the social sciences is described in a historical overview. Thereafter system dynamics is presented as a middle of the road approach for social scientist who want to use computer simulation. The methodology of system dynamics is demonstrated with exercises done by the participants on PC's with the aid of user-friendly software: STELLA. From a verbal description of a simple social problem, such as how to become rich by doing nothing, or how to prevent a disaster such as aids epidemic, cause and effect diagrams are made. Then those diagrams are translated in simulation models with which one can experiment to search for a solution of the problem.

With such exercises the underlying logic of system dynamics models is made clear, especially concerning the simple mathematics of differential equations. Thereby it is explained:

- 1) what linear differential equations are and what problems they can solve and what problems they can't solve;
- 2) why non linear differential equations are most of the time better suited to model social situations and problems.

With the later the tutorial arrives at the most intriguing domain of modern simulation research. That is to describe the surprising world of chaos and order. Participants are introduced in advanced computer simulation with fascinating non linear models of growth of a population, the spread of a disease and communication between human beings. A relation with more advanced software such as Matlab, to understand better the logic of non linear differential equations and to look more careful at the fit of a non linear model, is laid with more advanced exercises.