ABSTRACT

This paper, as delivered, will provide an overview and survey of modeling and simulation in the field of education and training. It will consist mainly of brief descriptions and comparisons of some thirty representative models and/or simulations. Each one is presented in detail by one or more of the documents in the bibliography which also contains additional references to partial compendiums, critiques, and elaborations of some of these models and/or simulations.

I. SUMMARY AND CATEGORIZATION OF EDUCATIONAL MODELS

Recent years have seen a number of educational systems models developed. Most of those which have been reduced to working computer simulations tend to be models of economic process, resource allocation, and various "costs" involved in managing a national education system, a school district, a university, or an industrial/vocational training activity. They tend to be:

a. Quantitative - treating in detail those aspects of education, such as enrollments, tuition, and facilities, most susceptible to "natural" and "objective" measurement.

b. Aggregated - treating "cohorts" of resources, blocks of students, and categories of support personnel rather than individual teachers, students, and classrooms. These models are generally intended to be used for gross predictions of the effects of alternative decisions by administrators

and of variations in parameters not directly controllable. They vary as to the amount and precision of the information required as input or produced as output, as well as the degree of determinism or randomness they assume or permit. Typically, they deal with throughputs of students as a function of faculty, staff, physical plant, and other "costs" of the operation of a school or larger educational entity. For the purposes of this paper, all these will be characterized as "economic" models.

A number of microcosmic, qualitative, functional models have also been proposed for the minute-to-minute process of learning and instruction. In general, these have not been reduced to computer simulations, mainly because of the unobservability of some of the functions postulated, and the difficulties inherent in dealing statistically with individual human decisions. These models are usually based on the principles of cybernetics, communication theory or one of the several schools of human psychology. Despite their tendency to vagueness and general lack of scientific validation, some of them have been found useful as tools for the design of programmed and/or computer-aided instruction packages. For lack of any better term, these will be called "instructional process" models of education and/or training.

BIBLIOGRAPHY


