

THE HIGHLIGHTS OF THE SIXTH ISAGA CONFERENCE  
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ISAGA is a nonprofit association founded in 1970 by R. Duke, A. Feldt and H. Hanson. It sponsored five conferences (twice in Germany, once in UK, USA and Holland) of which the most representative was the Conference in Berlin in 1974 where two hundred participants from nineteen countries got together. The Sixth ISAGA Conference in Milan was arranged by the ISAGA Secretariat, together with the European Cooperation for Informatics, British Computer Society, Italian Association of Operations Research and some other institutions. The Conference attracted about fifty participants from Italy, UK, Spain, Holland USA, Poland, Germany, and Switzerland, but the bulk of people was from Italy.

Seventeen presentations were planned and six manual and computer games were suggested for a demonstration session. However, due to organizational failures, not all of them were presented to the audience.

A theory of gaming was exposed clearly insufficiently. Perhaps the most interesting was the paper by G. Clibers (Neimegen University, Holland). The author considers one class of goal-seeking social systems, formulates three approaches to its description (approximation, aggregation, and decomposition), and justifies the use of decomposition as a rational approach to building the model of a system which belongs to the class under consideration. Then the concepts of stratas, levels, and echelons are introduced and three stratas are identified: causal strata, decision strata and normative strata.

A gaming simulation model is suggested where the causal strata and a part of decision strata are implemented by a

computer. Alternatives generated by the decision strata are displayed to a human decision-maker or a group of decision-makers for a final choice. The model may account for the consequences of decisions and has facilities for modifying decisions once chosen.

To my understanding, the work by Clibers is one of the first steps towards rigorous formal justification of the structure of a gaming model on the basis of modern tools of the complex systems theory.

The paper by K. Dette from the Technical University of Berlin was also directly related to the conceptual backgrounds of the gaming model's design. This is a description of a heuristic game for generating problems and finding their solutions. The game is called Scenario and uses gaming and scenario design principles for a problem statement, development of methods of forecasting and forming solution strategies. Unfortunately, this work does not contain analytical results and the efficiency of the suggested approach completely depends on the heuristics found.

Many more Conference presentations deal with descriptions of gaming models which solve different applied problems. Here the NSSG game by R. Duke (University of Michigan) is worth mentioning. This is a model for solving a nutrition problem in some hypothetical developing country. The work on the model was initiated by UNESCO with the purpose of obtaining an efficient instrument for a fast and deep understanding of nutrition problems in real countries. The model is grounded on real statistical data which concern agricultural production and food requirement in developing countries. It has two aggregated levels of decision making: distribution of the national budget over five ministries (ministry of agriculture, ministry of interior, ministry of industry and public works, ministry of health care and education, ministry of finance), and investment planning within each ministry. A hypothetical country has a population

of twelve million and a rate of annual growth of 3.5%. The country is conventionally divided into three zones: urban zone, rural zone and wild zone. Initial conditions correspond to a good nutrition level and a good state of health in the population. However, food inventories do not initially exist; thus the whole situation may be drastically degraded under the effect of random disturbances, e.g. a natural disaster which results in a poor crop.

A complete cycle of decision-making in the model includes distribution of a national budget, production planning in industry and agriculture, distribution of industrial and agricultural products evaluating a resultant nutrition level, and defining development priorities for the next planning period.

A first modification of the NSSG model is implemented as a board game with a wide application of mnemonic means for data presentation. The model seems to be very close to reality as far as representing of basic mechanisms and their interrelationship is concerned. It has been demonstrated to the Food Commission of UNESCO and produced a positive response. R. Duke is planning now to make the manual version of the game publicly available and also to further develop the model mechanisms, which will result in a computerized game.

An interesting model was presented by G. Raan (Stuttgart University, Germany). The model is aimed at studying a problem of a long-term planning of water supply for cities and conurbations. A calibration of the model was done using time series representing real data for cities of West Germany and Switzerland.

Urban gaming model CITTA - 1 was presented by G. Dandri (Centro Ricerche Economiche Sociologiche E. Di Mercato Nell Edilizia, Roma). The model is oriented at studying social and economic problems of a city with a population of about 20,000 people. It combines properties of CLUG (A. Feldt), LUGS (J. Taylor) and CITY (P. House) and widely uses LEGO

elements introduced by A. Feldt in the WALRUS model.

CITTA - 1 has an economic sector (three elements), a social sector (one element) and a political sector (one element). Interaction mechanisms involve environmental pollution, housing construction, building industry, and tourism. A quality of life is used as a management performance criterion. One decision period in the model takes about two hours and corresponds to a two year real planning period.

Another urban gaming model called INURBS was presented by Dr. I. Braken (UK). This essentially was a repetition of the 1973 results published by the Sheffield Center for Environmental Studies. Rather more interesting was another model by the same author called ECONOMY and aimed at studying relations among private sectors in industry, ministry of finance, banks and public investors. The model is built for educational purposes.

At the demonstration session, CITTA - 1, NSSG and METRO-APEX were exemplified. During this session the most active were research scholars and students who work with the problem of the development of Northern Italy. In spite of initial planning, the participation of the local managers was practically zero.

The following conclusions may be drawn from hearing the Conference presentation and looking through the proceedings:

1. It was a common feeling that the level of this conference was lower than that of the Berlin Conference.
2. The works on a theory of gaming simulation were poorly represented.
3. Although announced by the Conference program, the participation of representatives of governmental and local management bodies was not provided, due to the failures in functioning of the Conference Organizing Committee. The absence of practical decision-makers was especially felt during the demonstration session where their presence is of a critical importance.

4. There were several presentations on new gaming models aimed at studying management problems at the level of a city, a region, and a national economy. The NSSG by R. Duke seems to be the most interesting of them. I suggested that this model be demonstrated at IIASA. The demonstration took place on the 1st of July, 1975. About ten people from IIASA were present, F. Rabar and R. Levien being among them. By common opinion, NSSG represents real situations more closely, compared to other known models of the same class. The model documentation will be mailed to IIASA after final editing in two to three months. Bearing in mind a closeness of the model to IIASA interests in food and agriculture problems, common activities in further model development were specified and agreed upon.
5. Finally, arrangements have been made to involve several well-known scientists (R. McKinty, J. Taylor, R. Duke) in writing a gaming survey for the IIASA State-of-the-Art Series.