

Those who would use simulation as a training device need to examine the areas of simulation that are not only cosmetic in nature, but need to probe simulation's internal structure as well.

Simulation and Teacher Training: Is the Unreal Better?

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THE current emphasis on process education has prompted educators to consider other methods of presenting new curricular concerns to pre- and in-service teachers. The strategy of simulation has emerged as a means to achieve inquiry into philosophic and strategic implications of organizational patterns and curriculum materials. Several enthusiastic designers of simulation attribute the following instructional values to the simulation process: (a) allowing participants to resolve social conflicts; (b) providing participants with opportunities to choose rationally among alternatives; (c) encouraging participants to examine the methodologies, concepts, and principles of the subject matter in question; and (d) promoting analysis of value positions. The ebullience for the stratagem rests on what several investigators observe as simulation's inherent quality to hold interest and to create enthusiasm. Role playing has been suggested as the mechanism for this motivational trait.¹

Broadbent, Cruickshank, Kersh, and

Twelker have capitalized on simulation's power of involvement to train prospective teachers. The Cruickshank and Kersh studies concluded that student teachers regularly involved in simulation processes were able to maintain greater control of the classroom than those student teachers having more conventional forms of instruction.²

While enjoyment, motivation, interest, and active group inquiry are worthy educational pursuits, the increased physical movements and higher noise levels which are evident as participants play, negotiate, and compromise within a simulated environment do not necessarily result in a more economical method for achieving learning, nor do these pursuits change attitudes. Gordon³ brings simulation training into perspective with

² Donald R. Cruickshank and Frank W. Broadbent. "An Investigation To Determine Effects of Simulation on Student Teacher Behavior." *Educational Technology* 9: 50-54; October 1969; see also: Paul A. Twelker. "Classroom Simulation and Teacher Preparation." *The School Review* 65: 197-204; Summer 1967, citing B. Y. Kersh. *Classroom Simulation: A New Dimension in Teacher Education*. Project No. 886. Washington, D.C.: NDEA, Title VII, Teaching Research Division, 1963.

³ Alice Kaplan Gordon. *Games for Growth*. Palo Alto, California: Science Research Associates, Inc., 1970. p. 150.

¹ Clark C. Abt. "Games for Learning." In: Sarane S. Boocock and E. O. Schild, editors. *Simulation Games in Learning*. Beverly Hills, California: Sage Publications, 1968. p. 81; see also: James L. McKenny and William R. Dill. "Influences on Learning in Simulation Games." *American Behavioral Scientist* 10: 28-32; October 1969; E. O. Schild. "The Shaping of Strategies." *American Behavioral Scientist* 10: 1-4; November 1969.

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other techniques when she observed that of all the things that simulators know of simulation, the most zealous advocates are hard put to reveal if the objectives can be matched by behavior patterns of the participants.

Simulation's Inherent Qualities

What follows are considerations which designers recognize as complex functions within the simulation process. The descriptions are listed for those who would engage in a simulation training exercise or attempt to construct a simulation exercise.

Simulation evolved for the purpose of reducing and managing reality. The subject matter was either too imposing or it exhibited manifestations that needed to be explored further either for aesthetic or practical purposes. From the early cave paintings simulators have progressed to sophisticated models such as artificial organs, hydraulic harbors, and flood control systems. The space program has demonstrated the advantages of simulations. However, when educators attempted to utilize simulations for training purposes, their assumptions concerning the process were based on simulations created for use in the physical sciences. In contrast, simulations formulated for the purpose of manipulating non-human elements under strict laboratory conditions differ in function and in outcome from social simulations which involve human participants acting out various role profiles within a simulated environment and a simulated time period. If the task of a simulation is primarily conceptual with activities requiring concept-using and reason, especially where communication of information among members is of great concern, then the importance of conflict, competition, individual utility, and feedback are crucial considerations in the design.

In order to capture the intrigue of play, designers injected conflict situations into social simulations. It is conflict and its intensity which distinguish a simulation from a gaming role-play experience. And it is the conflict factor which results in various thresholds of competition. Therefore, when a social simulation exhibits a winning or losing

consequence, it is a simulation game. Experimenters have found that the competitive aspects of a management game do arouse motivation and help sustain interest, but the competitive element often leads participants to play conservative roles. The resultant rivalry among participants sometimes induces stress into the process.

Herbst conducted various studies concerning the amount of stress on participants during a simulated exercise. His studies indicated that if the participants were highly involved in a simulated task and if stress were low, the task was perceived as enjoyable. If the stress were high and involvement were high, the experience was viewed as unpleasant. An additional finding by Herbst revealed that the tasks must be perceived as having importance in order for participants to achieve satisfaction.⁴ Coleman cautions prospective designers to incorporate the consequence of winning or losing because these outcomes mirror life situations.⁵ If the exercise is designed to serve a pedagogical function, and an important and necessary factor of the model is the involvement of the participants through direct participation, then the intensity of conflict should be of little interest to the designer. Communication and cooperation would not be served under intense conflict situations.

Another variable within the process is the concept of utility. Utility refers to the inherent values of a gaming simulation for which participants are willing to strive. Utility is considered consistent and preferred over several trials. A consistent pattern indicates that a participant has for his goal the maximizing of his desires. Designers of simulation have little or no control over what a participant perceives as having utility, nor can they control the means a participant uses to

⁴ Robert A. Baker and others, "The Effects of Supervisory Threat on Decision Making and Risk Taking in a Simulated Combat Game," *Behavioral Science* 11 (3): 167-76; 1966.

⁵ John S. Coleman, "Social Processes and Social Simulation Games." In: Sarane S. Boocock and E. O. Schild, editors, *Simulation Games in Learning*. Beverly Hills, California: Sage Publications, 1968. p. 49.

achieve his goals. For example, the monetary rewards can be great for some poker players, but the thrill of a bluff may satisfy other poker players.

A corollary to utility is the concept of rationality. Rapoport pointed to the fact that, "... in a game, the potentialities and evaluations must be taken into account, ... unlike a fight, a gaming situation assumes rationality of the participants."⁶ Game theorists are not concerned with the psychology of the player; therefore, little control can be placed on the outcomes because of chance and intelligence. Winning can only be predicted over many trial runs, and most environments change in the long run.

The feedback component is a necessary requisite to the simulation experience. In simulation design, feedback must not be an implied or a haphazard factor. A co-worker of Skinner formulated the following principles related to feedback: (a) immediate reinforcement for correct answers is a must; (b) gradual progression is necessary to establish complex repertoires; and (c) to train for discrimination the student should write his responses.⁷

Feedback can be derived from the administrator of the simulation, from the interaction of the participants, or from programmed media such as slides, audio tapes, or mimeographed handouts. Since feedback contributes to expected outcomes, careful analysis of its nature and its medium is mandatory for expediting the flow of information. One has only to review the many models of decision making to discover that simulating an educational problem can lead to many outcomes. Because of the idiosyncratic nature of various decision situations, a single distinct decision-making system cannot be isolated. The aspects which typify decision making are: (a) the initiating stimulus; (b) the decision-output; (c) infor-

mation-inputs; and (d) a number of conditional statements and action statements.

The decision routine is affected by three major forces which include: (a) the dynamics of the individual; (b) the dynamics of the group; and (c) the dynamics of the environment. The significance of the environmental element is that the designer must determine which of the multitude of facets in the total milieu should impinge on the participants. Tansey argues that for student teachers the conventional knowledge-acquisition practices, "the context of learning is not the context in which the knowledge will have to be applied."⁸ He states simulation allows the participant to acquire knowledge in the form of a skill rather than an abstract concept. That outcome is also attributed to the case study method, microteaching, and field research projects.

The prospects of training individuals with a process which has for its goal winners and losers, appear to be incongruent with current curricular emphases on conceptual and investigative modes. Second, the human element cannot be controlled in the same manner as a mechanical flight simulator or a computer program of traffic flows. In addition, the criteria utilized by a social model builder for abstracting crucial elements from the referent system rest with his biases and his frame of reference. The real world can be viewed from many vantage points. What appears salient and necessary to one individual may be peripheral and obscure to another.

From the brief survey of selected internal aspects of social simulations, it becomes apparent that those who would implement simulation as a training device need to examine the areas of simulation which are not only cosmetic in nature, but need to probe simulation's internal structure as well. The constitutional framework of a social simulation is more complex than the simplistic prescriptions often related in general admonitions concerning "do your own simulations." □

⁸ J. P. Tansey and Derick Unwin. *Simulation and Gaming in Education*. London: Methuen Education Ltd., 1969. pp. 112-13.

⁶ Anatol Rapoport. *Fights, Games, and Debates*. Ann Arbor: The University of Michigan Press, 1970. p. 10.

⁷ Charles S. Morrill. "Teaching Machines: A Review." In: Richard E. Ripple, editor. *Readings in Learning and Human Abilities*. New York: Harper & Row, Publishers, 1964. pp. 469-78.

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