Simulation and Gaming
The What and Why of Gaming
A Taxonomy of Experiential Learning Systems

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It is difficult -- perhaps impossible -- to contribute much significance to the theory or philosophy of instructional games and simulations, without considering both in terms of the more generic concept of experiential or experience-based learning. From such a perspective, simulations and games, along with structured group exercises, role playing activities and encounter groups, are all instances of purposeful, structured, information-processing environments when learning is an intended outcome.

The conceptual roots of contemporary thought regarding experiential learning date to the works of John Dewey 1/ and Maria Montessori 2/ both of whom emphasized the role of experience and communication in classroom learning environments nearly three-quarters of a century ago. However, the current interest in experience-based learning would seem to be much less a direct consequence of those early developments, and more a reflection of complementary influences in various spheres of activity in more recent times.

One such thrust has come from the business and industrial community where in the past several decades an increased emphasis has been placed upon organizational development, human relations, internal communication, and employee and management in-service training, in general. In searching for training techniques which seemed theoretically sound and operationally compelling, games, simulations, role-playing activities and encounter sessions of various intensities proved attractive.

Social psychologists, sociologists and individuals in the fields of communication and management provided another influence as a consequence of their study of group dynamics, leadership and group decision-making. Experiential learning, and in particular the encounter group design, found growing acceptance also with psychiatrists, social workers, counselors, religious leaders and others who applied the techniques in therapeutic training contexts.

An additional source of influence came from work in the area of games and simulations. As Tansey and Unwin 3/ note, the use of simulation and games has a lengthy heritage, dating perhaps to the development of chess as a symbolic tactical encounter between opposing factions. War games of various sorts were also used widely in World War II, particularly by the Japanese and Germans and later by the United States and Soviet Union. 4/

 Perhaps the single greatest thrust has come as a result of a broadly-based questioning of traditional educational values, systems of instruction and approaches to learning. The scholarly contributions of Bruner 5/ and Rogers 6/ have been particularly impactful in this regard, along with the more popular works of such individuals as Postman and Weingartner, 7/ Riesman, 8/ Goodman 9/ and Holt 10/ to mention only a few. The following passage from the student-authored Champaign Report provides a succinct statement of some of the concerns which have since been voiced by many:

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The artificial gulf between ideas and action must be bridged so that learners learn ideas for action.

Faculty members ought to try taking a student to lunch sometime.

Smallness or largeness have no inherent value in an institution, but continued opportunity for contact with diverse primary groups must be offered to all students.

Efficiency has been overrated as an educational device, and chaos has been underrated.

We must develop devices for continued examination of what is significant and what is insignificant learning.

Base learning on problem solving. Get a bunch of freshmen together and tell them: We have a problem and we want you to work on it for the next four years. How do you feed the world? At the end of that time, you'll have sociologists and botanists and engineers and political scientists, and God knows what, but they will have learned because they had an important question to answer and because they thought their particular discipline might shed some light on it. 11/

In response to these and other suggestions, experience-based learning has been perceived as one potent means of rejuvenating and re-styling the standard classroom learning environment.

Nourished by these and other influences, experiential learning has continued to grow in popularity and acceptance. And, as has been noted often in the literature, experience-based learning, at face value at least, has numerous advantages over alternative instructional methods. For one thing, simulations and games are generally constructed with a problem focus and participants frequently seem well motivated as a consequence. Experience-based learning, it has been said, fosters questioning, inquiry and structural learning in addition to teaching specific content. Another frequently mentioned virtue of experiential settings is the capability for minimizing space and time constraints often present in alternative training contexts. Students need not wait days, months, or years to gain a sense of the consequences of their decisions and actions. Experience-based environments also seem to be particularly useful for helping students come to understand and learn to cope directly with change and ambiguity. And, of course, in laboratory environments risks, responsibilities and severity of outcomes can be controlled to make it possible for participants to "fail" without full consequence.
A TAXONOMY

In spite of the widespread application of the specific techniques of gaming, simulation, role playing and encounter groups, relatively little attention has been directed toward considering the more generic category, experience-based learning. The remainder of this paper is directed toward this goal. Presented is a classification scheme for categorizing experiential learning systems in terms of the structure of the activity and the instructional objectives of the facilitator. As the substance of this paper argues, these dimensions are critical both to the conception and operationalization of any experience-based learning environment.

The Structure of Experience-Based Learning Environments

Experiential techniques come in any number of different packages and with a variety of purposes. All experience-based instructional activities can be thought of as contrived human communication systems, and as such, all share in common a number of structural elements which are crucial to their operation. The five elements are:

1. roles
2. interactions
3. rules
4. goals
5. criteria

Structurally, simulations and games and other experiential designs involve: 1) participants case in roles, 2) interactions between those roles, 3) rules governing those interactions 4) goals with respect to which the interactions occur, and 5) criteria for determining the attainment of the goal and the termination of the activity.

Role

Experiential environments require participants. Except for those unique situations in which one participant "plays" against himself, there are always two or more individuals involved. The term role refers here to the identities individuals assume while taking part in a simulation, game, or encounter group.

In a number of games and role playing exercises, rather definitive and elaborate role descriptions are provided by the designer. In SENSITIVITY, for example, a portfolio containing a fictionalized biographical sketch is distributed to each player. Participants are asked to assume the role of the character described in the folio as best they can. The structural element of role is particularly crucial to this game, and all player activities revolve around their actions and reactions to one another in their assumed roles.

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The players, taken all together then become a group of very troubled people, who meet to gain some help and insights from each other. Each tries to make his character understandable to the group, communicating as much about himself and his problems as he can. 14/

SIMSOC15/ is an example of a more complex social simulation in which roles, specified in great detail, are extremely important to the functioning of the activity from both an operational and instructional standpoint. SIMSOC participants serve in roles in one of seven basic groups. Two of the groups are industrial units, and two are political parties. The other three are: an employee interest group, a mass media group and a judicial council. Additionally, a specified proportion of participants in the simulated society must be affiliated with one of the two political units and with the group of independents.

Members of the Party of the People (POP) are told that they are to emphasize individual autonomy and decentralized decision-making. "They are not rigid about such opposition, and are willing to accept planning and centralized coordination if it appears absolutely necessary." 16/

Members of the Society Party (SOP) are encouraged to emphasize central planning. "Its members believe that it is necessary for individuals and groups to yield some of their autonomy in order that effective leadership be provided and anarchy avoided." 17/ Independents are told they have no strong opinions one way or another about these issues.

Both SENSITIVITY AND SIMSOC are examples of experience-based instructional systems in which roles are prescribed rather specifically and have a crucial and generally predictable impact on the overall operation of the activity.

The encounter group, in idealized form, represents an experience-based environment, which differs dramatically with respect to the origin of the role definitions players assume. 18/ Roles -- the way participants are to act -- within such a group are not specified on an a priori basis, nor are they prescribed by the designer. The same is true, although to a lesser extent with two-team variations of PRISONERS DILEMMA 19/ and some versions of WIN AS MUCH AS YOU CAN. 20/ In each context, the nature of participant roles emerge primarily as a product of what players bring with them to the activity, and as a consequence of the interpersonal transactions that occur as the activity progresses.

STAR POWER 21/ and THEY SHOOT MARBLES DON'T THEY 22/ provide examples of structured environments which fall somewhere between the two extremes, with regard to role delineation, tending perhaps toward the less specified, less structured end of the continuum.
Interactions

The operation of all games and simulations depend upon the inter-relating of participants. The manner in which these relationships originate and develop may vary from one game or simulation to the next as does the method, procedures and channels available for transactions between players.

**MONOPOLY**, for example, utilizes a large number of devices to foster interactions between players including tokens, play money, "houses," "hotels," property deed cards, community chest and chance cards.

The availability and necessity of using multiple channels of communication is crucial to the functioning of **MONOPOLY** and to many instructional games and simulations.

In other games and simulations interaction channels and means for their utilizations may be less prescribed and specified. This is, for example, the case with most role playing exercises, where a wide range of verbal and nonverbal interactions are available to players as a part of the activity. The range and diversity of transactions between player roles are limited more by the range of a participant's ingenuity than by the design of the game or exercise.

**HANG-UP** is an example of a game which utilizes diverse channels of interaction. The game is designed to focus upon and increase participant sensitivity to the subtleties of racial differences. Participants react to a series of hypothetical "crisis situations," described on cards, as they think typical whites or blacks would. In turn, participants charade their reactions to the various crisis situations while others involved in the game try to guess the player's "hang-up," and whether he is playing the role of a white or black.

**INTERACT**, and its immediate predecessor **INTERMEDIA**, provide an instance of simulation environment which utilizes emergent and diverging interaction channels. Both simulations involve a laboratory society, the basic industries of which are communication and mass communication enterprises. Participants serve as Individual Agents, members of Mass Communication Organizations, Communication Agencies or an Executive Council. In addition, all participants serve as Consumers for communication products developed by the various Communication Organizations.

Together, Individual Agents and managers of the Communication Organizations negotiate, prepare and present their resulting communication products to the Consumers, according to a predetermined timetable. The Consumers are exposed to and in turn evaluate the products of each Communication Organization relative to one another and award income or subsistence points based upon their assessments. The points each Communication Organization accumulates are distributed among the members of its staff in whatever manner the organization selects.
In addition to this basic interaction pattern, a wide range of alternatives are possible. Essentially, any individual or group of individuals can provide any communication product or service to any group within the society so long as they are able to accumulate enough income points for their efforts to survive in the economy of the simulated society.

Rules

The interactions between participant roles in experiential contexts are governed by a series of rules or guidelines. Rules are typically specified by the designer and presented to the player as "instructions" for play. The number and specificity of rules governing the interactions vary greatly from one experiential activity to another. Rules may enumerate actions which are permitted of players, or they may list only those activities which are precluded, leaving open the possibility for all other actions.

This distinction is an important one. Those rules which specify and enumerate actions and behaviors which are permitted and necessary for participants can be termed prescriptive. Those rules which prohibit certain participant actions leaving all other possible behaviors open are prescriptive.

In some instances, the designer utilizes the rules and behavioral guidelines players bring to the situation as a primary source of rules for the game or simulation exercise. The encounter group may be an extreme form of this variety of rule generation. Particularly where one conceives of an encounter group as a simulation of the communication processes involved in social organizing, rules are generated from the participants' assumptions as to how the encounter group should progress, what activities and behaviors ought to be allowed and which should be excluded. At a minimum, several meta-rules must be imposed by the encounter designer or trainer. Individuals must, for example, agree to participate in the formation of the group and to react to subsequent activities occurring as the group develops. Additionally, a common rule limits content of discussions to issues of present relevance to members of the group, while excluding discussion of "back home" situations. This "rule" is often referred to as a "here and now" norm. As a group develops around even this minimal set of conditions, many more rules evolve, some of which are explicit — many others implicit. This process develops in much the same fashion in the encounter group as it does in a society or in any other social enterprise.

In other sorts of experience-based instructional exercises, traditional and direct means for interactions between participants are intentionally excluded by the rules in order to focus on particular issues. This is the case with the widely used COOPERATION SQUARES exercise, which has the following rules:

1. No member may speak
2. No member may ask for a card or in any way signal that he wants one
3. Members may give cards to others
Participants in this exercise are divided into five-person groups. Each group member receives an envelope containing several puzzle cards. When assembled, the puzzle cards possessed by the members of the group form five equal squares. No one member of the team has all the cards necessary to complete a puzzle-square. Only through exchanging pieces with other participants can the task of assembling five squares of equal size be completed.

The exercise and the discussion which follows is intended to focus upon the issues involved in communication and effective cooperation, and to help participants become more aware of how particular behaviors may help or hinder group problem solving.

Goals

While goals are crucial to the design and implementation of experience-based activities in general, the extent to which they are overtly presented to participants varies greatly from one simulation or game to the next.

In the cooperation squares exercise discussed previously, the activity goal is stated rather directly:

Each person should have an envelope containing pieces for forming squares. At the signal, the task of the group is to form five squares of equal size. The task is not complete until everyone has before him a perfect square and all the squares are the same size. 28/

Often the goal of an exercise, game or simulation is given in the instructions, stated as "the objectives" of the game. Where two or more individuals are involved, the goal often takes the form of a statement of what one must do "to win."

In contradistinction, the goals of an encounter group or to a lesser extent of simulations such as THEY SHOOT MARBLES DON'T THEY, INTERACT, or INTERMEDIA, depend primarily upon the decisions participants make and often emerge at a point well into the development of the activity. In such situations, the goals may never be articulated in the group as a whole, and it is not necessary for each individual's goal(s) to be identical with the goals of others.

Somewhere between these two extremes are games and simulations with multiple goals, prescribed by the designer. SIMSOC is an example. As indicated earlier, all SIMSOC participants serve in one of two political parties -- or as an independent. The Participant's Manual reads:

If you are assigned to one of the two political parties, you are to consider the achievement of the party's program one of your own personal goals and to work for this when it appears appropriate to do so. 29/
In addition to participation in one of seven basic groups with attendant goals, and political affiliation with additional goals, each participant must also select one of three personal goals -- power, wealth or popularity -- to emphasize in playing the game.

A participant adopting a power goal tries to influence what happens in the society as much as possible. Those electing to seek wealth try to accumulate as much of the currency of the society as possible by the end of the game. The third alternative is to emphasize popularity and strive to become as well liked by other stimulation participants as possible.

Criteria

Experiential activities must have a means of ending. A determination is made that the goals have been reached using certain criteria and this signals the end of activity. Some games and simulations rely heavily upon the use of fixed and prescribed criteria for determining when goals have been met and activity is to terminate. Others make use of the ambiguity that results when criteria for determining the achievement of goals are unclear, changing and highly personal. The criteria can be prescribed by the designer in advance or may emerge from the decisions of players.

In games where the goal is rather directly stated, often in terms of winning, the criterion is typically an announcement by a participating individual that in his assessment he has fulfilled the goal. "Bingo" is an example. A pronouncement of this sort is also used with the COOPERATION SQUARES exercise discussed previously.

In many cases the criterion for determining when the goal has been reached depends upon time constraints. This is the case in an encounter group or INTERACT where the length of time available is a primary factor in determining the termination of activity. Others, such as STARPOWER are terminated at the discretion of the facilitator with or without input from participants.

Internal and External Parameters

While all experience-based learning systems involve considerations relative to roles, interactions, rules, goals and criteria, not all experience-based environments apply these design parameters in the same manner.

Experience-based learning environments can be designed and utilized such that control of parameters is centralized in the hands of the designer as is the case with many canned or pre-programmed games and exercises, or control can be diffused among participants.
The dimension of control, so essential to an understanding of the instructional system, is also important to the appropriate design and utilization of instructional simulations and games. It would seem to be largely the deployment of parameter control which operationally distinguishes the more content-centered and predictable games and simulations from those which would seem to foster more generic an individualized learning. In those experiential activities where primary control of the parameters rests with the designer or instructor, the game or simulation can be said to be externally parametered. Where the control for establishing and modifying role, interaction, rule, goal and criterion parameters resides primarily with the participants, the activity is internally parametered.

Examples of external parameter games and simulations include the many structured, often computer-assisted, social and management simulations, games and related exercises where the participant strives to learn the designer's theory of a particular phenomenon. The participant in external parameter experiential environments, typically tries various strategies and procedures in an effort to arrive at a particular winning combination which has been predetermined by the designer or instructor.

External parameter simulations are frequently relatively simple, low ambiguity situations, with specified and prescribed role descriptions. The "right" and "wrong" strategies for behaving and interacting are fixed, or are varied in predictable ways known and controlled by the designer or educator. The criteria for winning are externally imposed.

Both the problems with which a participant deals, and the solutions to those problems have been determined on an a priori basis by the designer and have little or nothing to do with the actions and reactions of the participants. The correct strategies are essentially the same from one iteration of the game or simulation to the next.

While games and simulations which are externally parametered are numerous, there are few internal parameter games and simulations in existence. In idealized form, the encounter group represents one of the clearest examples. What it is that is to be learned, and the ways the learning is to occur are not specified or pre-determined by a designer, instructor or trainer, but rather depend almost totally upon what the participants decide to do and the ways in which they reach those decisions. Variation is tolerated and encouraged in internal parameter simulations. Problems are defined through participant thoughts and actions and are solved in a similar sense, rather than being imposed by the design of the game. In games and simulations where parameters are internal the activity of the participants generates and modifies the roles, interactions, rules, goals and criteria.

Figure 1 presents some major differences between the external and internal parameter experiential designs. (See page 68)
# Figure 1

**Structural Elements and Design Characteristics of Experience-Based Systems**

<table>
<thead>
<tr>
<th>Roles</th>
<th>Externally Parametered</th>
<th>Internally Parametered</th>
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<tr>
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<td>flexible</td>
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<tr>
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<td>complex</td>
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<table>
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<tr>
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<th>channels emerge</th>
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<tbody>
<tr>
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<td>prescribed</td>
<td>prescribed</td>
</tr>
<tr>
<td>low ambiguity</td>
<td></td>
<td>high ambiguity</td>
</tr>
<tr>
<td>few channels</td>
<td>available</td>
<td>multiple channels available</td>
</tr>
<tr>
<td>predictable</td>
<td></td>
<td>unpredictable</td>
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<thead>
<tr>
<th>Rules</th>
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<th>proscriptive</th>
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</tr>
<tr>
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<td>changing</td>
</tr>
<tr>
<td>low ambiguity</td>
<td>specified</td>
<td>high ambiguity</td>
</tr>
<tr>
<td>specified</td>
<td></td>
<td>emergent</td>
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<tr>
<th>Goals</th>
<th>imposed</th>
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<td>individual</td>
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<td></td>
<td>multiple</td>
</tr>
<tr>
<td>clearly defined</td>
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<td>ambiguously defined</td>
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<tr>
<th>Criteria</th>
<th>predictable</th>
<th>unpredictable</th>
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<td>single</td>
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<td>multiple</td>
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<tr>
<td>likely to</td>
<td>involve &quot;winning&quot;</td>
<td>unlikely to involve &quot;winning&quot;</td>
</tr>
<tr>
<td>clearly defined</td>
<td></td>
<td>ambiguously defined</td>
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</table>
Instructional Objectives

Clearly, no game or simulation is at the extreme position of being entirely parametered externally nor of being totally internally parametered. It must be noted that to some extent, all learning environments are participant controlled, whether that control is delegated explicitly be design or not. What is learned and the way that learning occurs always depends ultimately upon the learner. The game designer or user provides the necessary but not sufficient conditions for learning.

Notwithstanding this important point, the instructor or facilitator must continually make decisions as to the design and utilization of instructional methods -- including games, simulations and similar experience-based activities. Curricular decisions are made upon the basis of learning goals, and it would seem reasonable that decisions to design or utilize particular kinds of experiential systems be made on a similar basis.

The relative appropriateness of internal versus external parameters likewise would seem to depend upon the particular learning goals involved. External parameter simulations seem generally better suited for teaching specific content, while internal parameter games and simulations appear more appropriate for the learning of problem-solving processes.

Where the learning goals suggest that what is to be learned is specific, prescribable, predictable, and determinate, external parameter environments are appropriate in that the designer or implementing instructor wants all students to learn the target facts, strategies and procedures in the same way. The structural elements of the game or simulation will therefore need to be controlled and manipulated intentionally, to insure that participants deal with specific issues, using specific interactional channels, according to prescribed rules, in order to achieve the designer’s predetermined goals.

Take for example a role playing exercise designed to help students learn the content of a particular historical decision, experientially. The structural elements of the exercise would need to be controlled such that participants were unlikely to introduce "creativity" into the exercise, which might lead them to arrive at a decision quite unlike that which actually took place.

External parameter activities are generally appropriate when the learning desired is in the form of answers or decisions which are fixed, constant over time and tend to be technical in nature.

Internal parameters, on the other hand, are generally better suited than external parameters in instances where the learning is to be structural, general, not prescribable, unpredictable and indeterminant.
Experience-based activities designed to help students learn about the processes of decision-making, might utilize historical role playing exercises similar to that discussed previously. In this case, however, that which is to be learned is a process and learning specific content of decisions would be dysfunctional. Given this kind of learning goal, creativity is highly desirable, and it is not necessary -- nor desirable -- for all participants to learn the same things about decision-making in the same way from the exercise. Neither is it necessary for all of the individuals who participate to come to the same conclusions as to what were the "right" and "wrong" decisions.

Internal parameters seem generally more appropriate for teaching such things as communication, questioning, inquiry, leadership, decision-making, and social and organizational competence. These sorts of competencies and knowledges are situational, and the judgment of "rightness" or "wrongness," of an individual's style of attacking a problem, or coping with other people, is highly subjective and must always be evaluated relative to the context.

There are several additional criteria which are useful for distinguishing between circumstances appropriate to the use of external and internal parametered games and simulations. These depend upon the learning system meta-goals. Where the attempt within an instructional system is toward fostering homogeneity, uniformity and interchangeability among students external parameters are in order. Internal parameters are more appropriate where the meta-goal is to provide an environment which encourages heterogeneity, diversity, and individual uniqueness. Externally parametered simulations and games are therefore suggested where it is desirable for all participants to learn more or less the same things in more or less the same way -- as with specific content. If it is desirable for all participants to learn different things in diverse ways -- as with processes of problem-solving then an internal parameter design is probably better suited for the purposes.

**Concluding Remarks**

Hopefully, the preceding framework has some direct utility for classifying experience-based learning systems along the dimensions of structural composition and parameter control. By indirection, the scheme may also serve several subtle, heuristic functions:

1) It suggests that in addition to games and simulations, a wide range of techniques which at first glance appear unrelated, can be meaningfully subsumed within the category of experience-based learning.

2) It implies the potential relevance of theory and research from these diverse areas for understanding the scope, functions and outcomes of games and simulations.
3) It indicates the necessity of designing, utilizing and evaluating experiential techniques in a manner consistent with thoughtfully articulated instructional objectives.

4) It implies that the instructor or facilitator's posture within an experiential learning environment can be crucial to the nature and outcome of the total experience.

In my opinion, these four issues and the myriad of questions that they suggest, circumscribe a critical area of concern upon which comprehensive gaming theories of the future must ultimately focus.

On pages 65-66 of that volume Dewey says: "There seems a very practical existing tendency in the direction of the recognition of this principle, that fundamentally speaking, the educative process must be the same within and without the school walls....When we say the materials and methods are the same it is not that all distinction must be wiped out or overlooked, but it does mean that the school has for its function the organization in a more conscious and thorough going way the resources and the methods and materials that are used in the more unconscious and haphazard way outside."


12 A more extensive development of the ideas presented in this paper, with particular attention to the design and implementation of internal parameter simulations is provided in "The General Problem Solving Simulation," Brent D. Ruben, in Experience Learning, Robert S. Lee, ed., (New York: Basic Books, in press).

13 The game Sensitivity was designed and developed by60 Jorzh Kalb and David Viscott in 1969 and is distributed by Sensitivity Games, Inc. of Boston. Information included in this chapter on sensitivity is based upon the instructions furnished with the game.

14 "$\textit{Instructions},"$ the game of Sensitivity.


16 Ibid., p. 13.

17 Ibid., p. 13.


19 One variation of PRISONERS' DILEMMA for use with groups is provided in Human Communication: Simulation and Games, Brent D. Ruben and Richard W. Budd, (New York: Hayden Books, in press).

20 WIN AS MUCH AS YOU CAN is described in A Handbook of Structured Experiences for Human Relations Training, J. William Pfeiffer and John E. Jones, (Iowa City, Iowa, 1970)

21 STARPOWER was developed by R. Garry Shirts and is distributed by Western Behavior Sciences Institute.

22 THEY SHOOT MARBLES DON'T THEY is available from Learning A. and M., Ann Arbor, Michigan.

23 The game of Monopoly is distributed by Parker Brothers, Inc.

24 The game of Hang-Up is distributed by the Unitarian Universalist Association of Boston, Mass.

Information included in this chapter about Hang-Up is based upon the instructions furnished with the game.
The INTERACT simulation is described in INTERACT, Brent D. Ruben, (Kennebunkport, Maine: Mercer House Press, 1973).


Information included in this chapter is based upon the instruction sheet provided with "Experiment in Cooperation."


Ibid.