FUTURES GAMES AND SIMULATIONS
An Evaluation

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Future-oriented simulations/games move us away from the-die-is-cast past and present viewpoints toward the fluid shape of things to come. Out of awareness of the possibility of change we develop a desire to create preferred events.

If we were to inventory the controls we might want over time and events, there might appear to be some justification in shifting our orientation to a more distant future. We cannot change past events, and present events are occurring at a rapidly accelerating rate; food, energy, ecological, and population crises may suggest that the power to control events is out of reach.

Arthur C. Clark, in *Profiles of the Future* (1963), has detailed powers we might like to have over time, compiling controls without regard to their feasibility. He suggests that our ideal list of powers should include ways to (a) see, reconstruct, change, and travel into the past; (b) speed up or slow down the present; and (c) see and travel into the future. Impressive powers, we might agree, but certainly impossible.

The methods of simulation/gaming give us a chance to capture some aspects of powers over time which Clark has suggested. Through realistic re-creation of events, simulation/gaming can often provide participants with dramatic experiences in seeing, reconstructing, or traveling into a different epoch. When students reenact historical events during simulation/gaming—where the events, resources, or goals assume values the students have selected—they may thereby experience changing the past, creating their own "history."

There are many examples of the unique advantages of simulating events that might happen in the future. Many of us have seen television programs showing how simulation training prepares astronauts to land a spaceship on the moon and handle space travel emergencies. Many have learned survival strategies from fire drills. Some nations possibly have been deterred from initiating a nuclear holocaust because of conclusions they reached from observing their simulations of the consequences of war.

While science fiction books and films give us opportunities to observe possible future events, the simulation/gaming approach moves a step beyond to create an environment within which the participant may actively engage and interact with the potential events. These alternative future events may not only be seen, but they may be traveled into through the time-transcending system of simulation/gaming. Concrete experiences with hypothetical events become reality. Although the events being simulated are hypothetical, the experiences of the simulation are real. We become engaged in a process of making believe for real.

Dynamic Modeling of Alternative Futures

Designers of simulations/games involving human interaction, when attempting to dynamically model alternative futures, proceed through a process of design, development and testing that generally includes the following major phases:

(1) *Awareness is directed to probable, preferable, or possible future events.* Initially, a set of likely or hypothetical events receives attention. Growing from and awareness of these multiple alternative future possibilities and their potential consequences, we systematically focus upon a few future events that may pose the most important consequences. Attitudes toward these events are typically strongly positive or negative, depending upon the desirability of the conditions envisioned.

(2) *Components of a model of events are specified and organized.* A framework, structure, or model of reality is constructed in an attempt to portray accurately the most crucial features of the events of interest. At this point we proceed through two simultaneous stages:

   (a) We create an abstract or symbolic model that imitates the real or possible events, and perhaps changes their scale, in an attempt to direct attention to specific elements.

   (b) We attempt to preserve the organization of the interreleationships among the elements in the model in an attempt to faithfully reflect the patterns of events to be simulated.

(3) *An operable simulation/game is designed which gives concrete form to possible events.* Goals, constraints, rules, roles, assumptions, values of resources, and other structural elements are specified as limits within which

Editor's Note: *Prospects* is listed in the self-development section, and *Edplan* and *Edventure II* in education. The rest of the simulations and games discussed in this essay are listed in the futures section.

simulation participants are free to operate. Although the simulation design process may be a deliberate attempt to represent a model as accurately as possible, it will also be the result of a number of compromises and arbitrary decisions. A simulation should always be understood to inherently reflect the knowledge, preferences, and perspectives of its creator. To acknowledge bias in the design process is not to attribute ulterior motives to the designer, but is merely to recognize that it is often not possible to incorporate as many features, or to portray them as accurately, as one may wish. Of course, distortions may be deliberately incorporated, and in some cases may even be the central purpose.

(4) *Operation of the simulation/game is initiated.* The initial structure of the simulation/game is superimposed as a created environment surrounding participants. Their actions subsequently feed back information that is actively or passively accommodated, or responded to, when it interacts with the framework of the simulation.

(5) *Feedback created by participants in the simulation/game becomes the stimulus for subsequent actions during the simulation operation.* The behavior of participants is a crucial input which interacts with the simulation structure to produce a successful simulation/game enactment.

(6) *Operation of the simulation/game is repeated, replicating or varying simulation elements.* Greater confidence may be placed in the validity of the simulation, or the interrelationships of its elements, when it is repeated under exactly the same conditions, with the effects noted. Carefully controlled manipulation of a few variables of interest may also offer evidence of validity if predicted consequences occur.

(7) *Events created by the simulation enactments are observed and/or evaluated while the model is operating.* Observable actions, or any products created by the simulation enactments, can provide a basis for future modifications, or for evaluating questions of interest.

(8) *Termination of simulation/gaming occurs at some stage.* The dynamic modeling of alternative futures through simulation/gaming is concluded.

(9) *Generalization from the simulation/game through the model to the future events of original interest may be attempted.* The validity of generalizing to future events must rest ultimately upon either (a) the degree to which predictions match real events or (b) the extent to which control over present events is enhanced through engaging in the process of future-oriented simulation.

THE SIMULATIONS

We will compare, categorize, and evaluate twelve futures research-based simulations in terms of their underlying models, educational purposes, procedures, content, and outcomes. First, we will analyze their educational uses, briefly describe each simulation/game, and note some preliminary factors to be considered in a selection decision, including age level, playing time, and the number of players and groups the simulation/game accommodates. Second, we will present the stated educational objectives from each simulation/game manual, as well as an analysis of the knowledge and skills participants learn or apply. Third, we will summarize the sequence of major activities, types of roles and role descriptions, and an evaluation of the roles and rules of each simulation. Fourth, we will review the resources most relevant to participants' success and describe the scoring systems. Fifth, we will review the packaging, cost, completeness, and durability of the simulations. Sixth, we will analyze the debriefing procedures and comment on the adaptability of the simulation/game to other purposes and/or audiences. Finally, we will present an overall rating of the simulations based on all these dimensions to help users select and evaluate those most appropriate for their purposes.

All simulations/games selected for review are future-oriented, have been played a number of times, are available within the United States, and cost less than $100 (in most cases, less than $20). All incorporate the findings and/or techniques of futures research, and each can be applied to achieve one or more stated educational objectives. All are creatively designed and are highly arousing and motivating, or fun to play, or both.

Educational Uses

These simulations/games may serve one or more of the following educational uses:

(1) *Teaching analytical skills through estimating probabilities:* Explore or estimate the probabilities that hypothetical events or trends are likely to happen through using opinions of experts in several rounds of consensus-building.

(2) *Exploring possibilities:* Create a climate of suspended judgment in which possibilities may be seriously explored. Futures simulation/gaming is particularly helpful when the possibilities to be considered may appear remote, irrelevant, or threatening to the target group, or when people's opinions about the issues or events are so positively or negatively charged that they find it difficult to consider alternative points of view or even new information.

(3) *Learning futures research skills:* Learn some of the skills involved in conducting futures research through experience in applying delphi methodology, cross-impact analysis, and other futures research techniques as a simulation participant.

(4) *Clarifying preferabilities:* Develop a clarification of values and preferences regarding highly desirable future events or goals, regardless of the likelihood that they will happen or be attained.

(5) *Developing future-focused role images:* Develop a more future-focused role image through opportunities to think clearly and specifically about one's own future and to begin planning immediately to take action to achieve desired outcomes. Broadening perspective in space and time encourages individuals to think more creatively and imaginatively, so they will not expect their personal futures simply to mirror the past.

(6) *Increasing optimism:* Increase feelings of control over the future through simulated opportunities to confront personally relevant issues before they happen in the real world. The chance to try out alternative courses of action, especially with situations often perceived as outside one's sphere of control or influence, may help

TABLE 1 Educational Uses

Educational Uses	*Futuribles*	*Dynamic Modeling of Alternative Futures*	*Simulating the Values of the Future*	*Space Patrol*	*Hybrid Delphi Game*	*Future Planning Games*	*Cope*	*Utopia*	*Prospects*	*Edplan*	*Edventure II*	*2000 A.D. Future City*
1 Teaching analytical skills through estimating probabilities	H	H	H	H	H	M	H	M	H	M	H	H
2. Exploring possibilities	H	H	M	H	H	H	H	H	H	M	H	M
3 Learning future research skills	M	H	M	L	H	M	H	H	M	L	L	M
4 Clarifying preferabilities	H	H	H	L	H	H	M	H	H	H	H	H
5. Developing future-focused role images	H	M	M	M	M	H	M	H	H	L	H	L
6 Increasing optimism	H	M	M	H	M	H	L	H	H	L	H	M
7 Experiencing decision-making opportunities/ confronting moral or ethical dilemmas	H	H	M	H	H	H	H	H	H	M	M	H

Key H = Highly useful
M = Moderately useful
L = Limited usefulness

develop optimism, strategy, and skills in approaching real situations.

(7) *Experiencing decision making opportunities; confronting moral or ethical dilemmas*: Decision-making strategies and techniques may be applied to moral and ethical problem situations. Group debate, discussion, persuasion, and consensus-building may help clarify facts, inferences, and implications, as well as clarifying underlying values and assumptions.

We have reviewed each of these simulations/games in terms of a variety of these potential educational uses, and the reader can make detailed comparisons by reviewing tables on their educational uses (Table 1), summary descriptions of their content and process (Table 2), their objectives (Table 9), their issues (Table 7), possible values promoted (Table 6), and model characteristics (Table 8).

Futuribles and *Prospects* receive, respectively, seven and six ratings of highly useful. *Edplan* is the most limited, receiving a high rating only for the purpose of clarifying preferabilities. Although *Simulating the Values of the Future* is cited as highly useful for only two purposes, it achieves them extremely well and is clearly one of the best simulations/games for those purposes.

TABLE 2 Summary Descriptions of Simulations/Games

Simulation/Game	Description
Futuribles	A game engaging the player in prediction, clarification of, or commitment to possible, preferable, and/or probable future projections in 19 categories, with 288 cards
Dynamic Modeling of Alternative Futures	A series of five simulation/games for adults employing the methods of delphi, in-basket exercise, dynamic modeling, and a "game as reality" paradigm. Topics include predicting desirable futures, assessing needs, identifying

TABLE 2 Summary Descriptions of Simulations/Games (Cont)

Simulation/Game	Description
	creativity, simulating a lifetime, and modifying a behavior.
Simulating the Values of the Future	A delphi simulation designed by Olaf Helmer to disclose the interaction of technology and values. Participants as "experts" consider probability and difficulty weightings in 20 areas and 186 specific events, and achieve consensus. Evaluating the desirability of the events is then conducted from the perspectives of five different groups.
Space Patrol	A sophisticated science fiction war game provides a simulation design and rule structure for generating "Star Trek" or Star Wars types of scenarios. Precise directions help users create their own scenarios, characters (aliens and creatures); determine success probabilities; account for gravity and movement; and provide for contact, combat, and recovery.
Hybrid Delphi Game	Participants rank the desirability of future events, achieving consensus through a delphi process on most desirable events. Users could readily put in alternative future events for evaluation, discussion, and debate
Future Planning Games	Brief classroom activities and attitude questionnaires have students discuss and debate issues within different games on future issues: constructing a political philosophy, planning tomorrow's society, focusing on the ecology crisis, constructing a life philosophy, planning tomorrow's prisons, determining America's role in the world, determining family and sexual roles, dealing with death, protecting minority rights, examining American values, dealing with developing nations, determining economic values, and preventing crime and violence. Supporting paperbacks on opposing viewpoints are available

TABLE 2 Summary Descriptions of Simulations/Games (Cont)

Simulation/Game	Description
Cope	Participants are "born" into the future city of Technopolis and experience five ten-year periods, earning "Creative Work Units" for solving problems of living, which include (1) thinking about future alternatives, (2) solving society's problems, (3) learning a FUTURESPEAK abbreviated language, (4) evaluating technology, and (5) coping with rapid change.
Utopia	As part of a communal experimental group in Sunrise Valley, students develop an "ideal" society and clarify their own ideologies. Through exposure to alternatives for organizing society's politics, technology, economics, and morality, students conduct research and present "ideal" solutions which the group evaluates.
Prospects	A self-administered simulation leading one to disclose future career goals, evaluate career and training needs, and maintain and enhance the relevance of one's skills, to avoid professional obsolescence.
Edplan	Focusing on the politics of educational decision-making, players may assume roles as various interests in a community converge on the issue of allocating a future school system budget. Through debating the emphasis on components of the new school program, participants meet, formulate presentations and lobby, participate in a school board meeting, have city and federal agencies review their requests, have elections for city council and school board, and determine outcomes for the school.
Edventure II	This career guidance game for students projects them into a role profile character with varied levels of strengths, needs, experience/education, savings, and surplus income. Through their selections from an "Education Menu Book," they plan their characters educational life from 1981 to 2000 and experience the consequences in terms of life satisfaction, surplus income, and savings for retirement.
2000 A.D. Futura City	This self-contained multimedia kit combines narrative readings, handouts, a cassette and filmstrips, displays, and simulation materials to form an opportunity for students to clarify values, analyze trend indicators, evaluate priorities, interpret scenarios, conduct trend extrapolation, and experience group interaction. Twenty to thirty participants role play the future planning of an urban city afflicted with many problems of decay and alienation. In the process of reading carefully selected and edited readings, they generate an urban plan, present it to the Constituent Assembly, reevaluate and bargain, debate, and vote. Simulation concludes with a structured debriefing and evaluation.

PRACTICAL CONSIDERATIONS

Age Level, Group Size, Playing Time, Flexibility in Outcomes/Issues

Table 3 presents the simulation/game age levels, playing time, number of players, and number of groups, along with the range of possible outcomes and issues. *Prospects*, intended primarily to aid users in avoiding obsolescence in their chosen careers is classified at the highest age level. The playing times for the simulations/games range from 15 minutes for *Futuribles* to 17 hours for *Cope*, a simulation that organizes classroom activities for four weeks of 50-minute periods. Although among the longest in duration, *Cope* and *Utopia* are extremely well organized in specifying a calendar of activities, teacher instructions, and student projects. Numbers of players and groups range from a single player in a self-administered mode, as in *Prospects*, to as many as 30 players in ten groups, as in the original enactment of *Simulating the Values of the Future*. (To apply that simulation with as many players would require extensive preparation of additional materials, however.)

You can readily determine the flexibility of the simulations/games by reviewing Table 3 on possible outcomes and issues. The most flexible is clearly *Futuribles*. Packaged as a deck of cards, it is highly portable, nominal in cost, and embraces the spectrum of possible approaches to the future in the outcomes sought and issues treated. It is the most adaptable simulation game for application with a variety of age levels, given differing time constraints. You can keep the issues simple or readily make them more complex. The least adaptable simulation/game reviewed is *Edplan*, in that its large-group format and its highly political planning arena restrict the range of issues, alternatives, and outcomes.

Complexity

The complexity of the simulations is reflected in Table 4 by the placement of the simulations along a continuum from simple to complex. This generally parallels their age range, with the more complex simulations most effectively applied at the age of 16 or older. The simulations involving the greatest complexity—especially in the manual of instructions and in the amount of computations necessary to implement or score—include *Space Patrol and Simulating the Values of the Future*. However, although they are complex by comparison with the other simulations, the calculations require simple addition, subtraction, multiplication, or division, which can be done with a pocket calculator. At the other end of the continuum, procedures for playing *Futuribles* and *Future Planning Games* are clear and easily understood. These games can be equally effective with 12-year-olds and adults, with only minor adaptations.

SEQUENCE OF MAJOR ACTIVITIES

For most of these simulations/games, the sequence of activities frequently involves presentation of rules and objectives, distribution of player materials (role descriptions, scorecards), information input, several rounds of play, evaluation, and

TABLE 3 Age Level, Duration, Number of Players/Groups, Range of Outcomes/Issues (Cont)

		Duration		Players			Outcomes		Issues	
Simulation	Age Level	Degree of Flexibility	Playing Time	Degree of Flexibility	Number of Players	Number of Groups	Degree of Flexibility	Range of Possible Outcomes	Degree of Flexibility	Range of Possible Outcomes
Utopia	High School+	Low 50-minute class sessions each day for 2½ weeks (13 sessions)		Low entire class (8 to 35 possible)		2 8	Moderate Group decisons on moral, economic technological, and political systems, individual written reports, written proposals for group consensus decisions, oral reports		High How does one *construct* a moral, economic, technological, and political system? How does one *enforce* it? How does one judge disputes, and what standards/criteria are applied? How does one control outcomes, and socialize people to accept the system? Are minority rights protected?	
Prospects	College+	Low 4½ hours with follow-up session 1 month later		Moderate 1 or more 1 booklet per participant		0	Moderate A future career profile, action plans, list of ideal and and expected jobs, review of related issues, broad range of alternative roles can be considered and evaluated		Moderate What should my future career be? What are my strengths/weaknesses? What are my ideal and expected jobs? Do relevant others share my perspectives? Are my action plans realistic?	
Edplan	High School+	Moderate 1½ to 3 hours		Low 29 to 36		6 11	Low Presentations of viewpoints from role positions of a school system administrators school board, city council, PTA, federal aid representative, and taxpayers Experience in debate, lobbying, and elections		Low The game is largely a political view of planning, demonstrating how various interest groups interact to determine an educational budget. Different political factions can be substituted	
Edventure II	12 yrs+	Moderate 1½ to 5 hours		High 1 to 45		0	Low Experience with with educational planning, and its consequences from 1981 to 2000, a record of "satisfaction" income, and savings resulting from 19 years' decisions, different educational experiences could be offered		Moderate The impact of earlier decisions upon later alternatives becomes clear, the possible relationships of education, work, and leisure to both income and satisfaction is explored in a context of constraints and opportunities	
2000 A.D. Futura City	14 yrs+	Moderate 3 to 10 50-minute class sessions (5 to 8 hours)		Low 20 to 30		8	Low After research presentations and debate, an urban plan is presented to a simulated "Constituent Assembly" and voted upon, with rounds of re-evaluation and bargaining, factors to be considered in decision making can be modified		Moderate What kind of future do you want? What future events and possibilities do futurists envision? Can you invent your own future? How should a city plan to use two tracts of land?	

TABLE 4 Complexity

Complex				Simple
Space Patrol	*Dynamic Modeling of Alternative Futures*	*2000 A.D. Futura City*	*Edplan*	*Futuribles*
Simulating the Values of the Future		*Prospects*	*Edventure II*	*Future Planning Games*
		Cope	*Hybrid Delphi Game*	
		Utopia		

TABLE 5 Major Activities in Sequence

Simulation	Activities
Futuribles	(1) form groups; (2) deal cards; (3) get familiar with cards; (4) player chooses card to place face up on basis of probabilities (most likely), feelings, cause and effect, values, before and after, scenarios, inventions, leverage, priorities; (5) draw new card; (6) process continues in turn; (7) end when all cards drawn.
Dynamic Modeling of Alternative Futures	*Delphi*. (1) receive future forecasts; (2) assign probabilities; (3) receive feedback; (4) revise estimates; (5) consider new items; (6) recycle until all items done *Alternative Future Analysis and Review*: (1) teams generate lists of 5 desirable future events; (2) compile master list of 10; (3) each team secretly selects most desirable event; (4) team receives as many points as number of teams choosing same event; (5) events given desirability ranks, (6) generate list of top five events *Identification of Gifted Simulation*: (1) futuristic multimedia scenario; (2) review application blanks, (3) make individual selections, (4) make group decisions; (5) feedback in one of 2 modes. (a) information only or (b) detailed didactic debriefing; (6) administration of criterion measures/attitude scales. *Label Game*: (1) read rules and distribute game board materials; (2) players begin at start, toss die, move markers, (3) labeling rings awarded, (4) labeling stigma/consequences result in tracks; (5) achieve differential success, (6) debriefing discussion of implications. *Toward Walden Two*: (1) read rules, (2) select reward goals, (3) sign game contract; (4) information input by one of three self-selected modes; (5) form teams; (6) select case study; (7) designate "observers" and "earner" roles; (8) "earners" discuss solution while observers record their behavior; (9) earn points; (10) player's points compared to reward costs; (11) rewards purchased and enjoyed; (12) debriefing and discussion, (13) recycling.
Simulating the Values of the Future	(1) introductory address on "Interaction and Technology and Values"; (2) divide into 10 groups of three types (a) planners, (b) social predictors, (c) evaluation committee; (3) planners allocate resources to raise probabilities of events to raise GNP or promote better values/freedom; (4) consensus in goup; (5) final resource allocation; (6) determine probabilities associated with events, (7) make social predictions, (8) compute importance and likelihood of social consequences; (9) achieve consensus; (10) evaluation committees determine preferences and desirability of alternative futures, (11) Final plenary assessment session in which weighting is conducted for population sectors, (12) dual debriefing of outcomes and methods.
Space Patrol	(1) introduction; (2) prepare materials; (3) generate and select scenario; (4) select role; (5) create characters and aliens with 13 dimensions; (6) select equipment; (7) enact contact/recovery/combat scenario; (8) use Space Patrol Tables to compute outcomes
Hybrid Delphi Game	(1) instructions; (2) individuals read and rank for desirability 90 statements about 20-year-distant future events; (3) share results; (4) form groups of 3 known least well; (5) groups negotiate consensus list of 15 most desirable futures, (6) total group consensus of 16 most desirable; (7) discussion.

TABLE 5 Major Activities in Sequence (Cont)

Simulation	Activities
Future Planning Games	(1) introduction; (2) compare alternative viewpoints on roles, policies, and decisions; (3) disclose personal attitude toward viewpoints through rating on 11-point continuum; (4) design or decision-making exercise; (5) group decision-making on controversial issues and specify recommendations, (6) formulate an integrated, philosophical position on issue.
Cope	(1) organize materials and room; (2) overview, (3) future role diagnosis, (4) students review guide and write questions; (5) related information search for "library of future"; (6) reading; (7) discuss coping with change; (8) move into city, get ID card, fill out Creative Work Unit (CWU) data card, read Creative Production Module (CPM 1) handouts; (9) CPM 1 Job Training; (10) CPM 1 Tasks, (11) presentation/evaluation; (12) allocate/record CWUs; (13) CPM II Job Training; (14) analyze bulletins; (15) CPM II Tasks, (16) allocation of CWUs; (17) CPM III Job Training; (18) begin accelerated computer clock, (19) analyze bulletin, (20) allocate/record CWUs, (21) decision point on future of micro-society; (22) debriefing of issues using Cope evaluation debriefing guidelines
Utopia	(1) overview of Unit Time Chart; (2) students read Phase I guide, (3) class grouped into subunits, (4) initiate Sunrise (Commune) Log in response to Situation 1; (5) Complete situations 2, 3, 4, 5; (6) panel discussion; (7) students read Phase II guide; (8) form four systems/groups: morality, economic, technological, political; (9) groups divide research responsibilities for individual reports; (10) work day; (11) individual reports to group, groups report to class; (12) conclave, (13) Sunrise evaluation; (14) allocate subsystem duties; (15) develop subsystem proposal reports (16) groups receive reports; (17) spokespersons give recommendations for declaration of Utopian Commitment; (18) committee writes commitment; (19) discussion; (10) debriefing.
Prospects	(1) overview; (2) review of one's past and present; (3) shared review; (4) looking to the future, (5) some reality testing; (6) relevant others identified who can influence outcomes.
Edplan	(1) set up game; (2) read scenario; (3) assign roles, (4) designate group leadership; (5) group meetings, (6) free period; (7) school board meeting, (8) formulate budget; (9) lobbying; (10) City Council and Federal Aid Representative consider funding requests, (11) City Council and School Board elections; (12) campaign speeches; (13) elections
Edventure II	(1) overview, rules, role descriptions, 20-year history form, and educational institutions; (2) course enrollment, (3) record initial situation on role profiles, (4) education and plan work; (5) purchase education or select work; (6) compute final outcomes in satisfaction points, surplus income, and savings.
2000 A D. Futura City	(1) Filmstrip, background reading, layout and distribution of materials; (2) game introduction: (3) set objectives and priorities in group; (4) urban plan; (5) presentations to Constituent Assembly; (6) re-evaluation; (7) group bargaining; (8) assembly debate; (9) final adjustments; (10) vote; (11) debriefing; (12 evaluate group performance.

debriefing. Detailed information on the major activities in sequence appears in Table 5.

VALUES

Participants in simulations are often implicitly encouraged to value certain points of view, often not as a direct result of the simulation's stated objectives, but as a result of the content it includes (and excludes) and of the processes or viewpoints participants feel are encouraged and rewarded when they dynamically interact with the simulation/game. We have evaluated each of the simulations/games in terms of the degree (high, medium, or low) to which they may promote nine possible values in Table 6. *Futuribles, Future Planning Games,* and *Utopia* rate high on six of the nine values. To the extent that these values are desirable to the user, these simulations/games would be excellent choices. *Space Patrol,* on the other hand, promotes only two values to any great extent, and these are expected from a science fiction game—valuing technological advancements as solutions to problems and valuing speculation about the future for present entertainment and enjoyment.

ISSUES

These futures research-based simulations/games confront a variety of issues ranging from the obviously future-oriented issues of predicting events or determining priorities for which technological innovations should be developed, to more present-oriented issues of controversial lifestyle and political choices, as well as emergent issues in educational administration, organizational and urban planning, and proposal writing. *Futuribles, Edplan,* and *2000 A D.,* most issue-laden, confront seven or more of the 13 issues listed in Table 7.

THE MODELS

An underlying model provides the structural basis for a simulation. The model will always indicate the most crucial features of the events that are of interest and will attempt to show precisely the relationship of parts to the whole. Although most simulations represent real-world events (flying an airplane, passing a bill through Congress), this cannot be the case with future-oriented simulations, which deal with hypothetical future events, or futuribles (future possibilities), as De Jouvenal has called them in *The Art of Conjecture* (1967). In Table 8 we present a brief description of the underlying

TABLE 6 Possible Values Promoted

Values	*Futuribles*	*Dynamic Modeling of Alternative Futures*	*Simulating Values of of the Future*	*Space Patrol*	*Hybrid Delphi Game*	*Future Planning Games*	*Cope*	*Utopia*	*Prospects*	*Edplan*	*Edventure II*	*2000 A.D. Futura City*
Clarification of own values regarding the future	H	H	H	L	H	H	H	H	H	H	H	H
Valuing personal planning for the future	H	L	L	L	M	H	M	H	H	L	H	L
Valuing utopian ideals as serious future alternatives	H	M	M	L	M	H	M	H	M	L	M	M
Valuing participatory group process and consensus building activities as decision-making strategies in planning for the future	L	H	H	L	H	H	M	H	L	H	L	H
Valuing knowledge of probabilities of future events (prediction)	L	M	H	L	M	L	H	L	L	L	L	M
Valuing technological advancements as solutions to problems	M	M	H	H	M	L	M	L	L	L	L	H
Valuing alternative social or interpersonal structures as solutions to problems	H	H	L	L	M	H	M	H	M	M	H	H
Valuing speculation about the future for its present entertainment and enjoyment	H	L	L	H	L	L	L	L	L	L	L	L
Valuing a comprehensive vision of tomorrow	H	M	M	L	M	H	M	H	L	L	M	L

Key: H = High
M = Medium
L = Low

TABLE 7 Issues

Issues	*Futuribles*	*Dynamic Modeling of Alternative Futures*	*Simulating Values of of the Future*	*Space Patrol*	*Hybrid Delphi Game*	*Future Planning Games*	*Cope*	*Utopia*	*Prospects*	*Edplan*	*Edventure II*	*2000 A.D. Futura City*
Determining priorities for which technological innovations should be developed	S	S/F	S		S	O	S	S				
Forecasting the probability of future events	S	S	S		O	O	O	O				O
Determining which group should have the most power to determine the future	O	O	S	S	S	S	S	S		S		S
Systematically studying future possibilities through learning to apply futures research methods (Delphi, Trend Extrapolation, etc.)	S	S	S		S		S	S	S	S		S
Exploring science fiction fantasy	O		O	S	O	O	O	O				O
Clarifying personally desirable future events	S	S	S		S	S	O	S	S/F	S	S	O
Presently experiencing a scenario of a possible future event	O	S		S		S	S	S/F		S/F	S/F	S/F
Exploring educational administration	O	S/F			O	O			O	S	S	
Confronting controversial present issues through exploring alternative future social and interpersonal lifestyles and/or social policies	O	S	O		S	S	S	S	S	S	S	S
Planning a personally successful professional and educational career which avoids obsolescence and insures productivity and satisfaction						O			S		S	
Writing proposals for innovative ideas that may receive government funding						O	O	O		S		S
Urban planning and design which is highly responsive to human needs and values						O	O	F				S
Organizational planning and decision making	O	S/F	S		O				O	S		S

Key: S = Issue significant
O = Issue optional and may be included in variations of simulation game
F = Frame game allowing players to design and insert issues

models for the simulations/games. These models range from real-world controversial social issues that are likely to continue to be important issues in the future (*Future Planning Games*), to the science fiction scenarios generated in creative fantasy (*Space Patrol*).

STATED EDUCATIONAL OBJECTIVES AND ANALYSES OF KNOWLEDGE AND SKILLS

One of the most essential factors in selecting a simulation/game is the type of educational objective it is designed to achieve. We have presented this information in two ways. First, we have summarized the stated objectives as specified in

TABLE 8 Models of the Simulations/Games

Simulation	Model Characteristics	Evaluation of Models
Futuribles	Possible future trends/events/conditions selected from those generated in Delphi studies constitute the possible future situation modeled	This cards game's rounds provide an excellent model of future studies techniques in simple form. The range of real-world situations is comprehensive in treating 19 areas.
Dynamic Modeling of Alternative Futures	Delphi. Experts predictions of 25 to 50 potential future developments serve as the model for the game.	Validity of the model depends entirely upon the particular group of experts chosen
	Alternative Futures Analysis and Review Participants generate lists of desirable future events based on their own experiences	Validity of the model is determined by the real-world information base of the particular participants.
	Identification of the Gifted and Talented. A 2000 A D scenario of a hypothetical "Presidential Advisory Board for the Identification of Gifted and Talented Youth" presents participants with a decision-making task involving the selection and admission of gifted and talented students into an elite educational program.	A very realistic underlying model that closely parallels the adoption process or the selection of foster parents.
	The Label Game A formal model of the dynamic concept of a hypothetical life career of special education students is stated, based explicitly and closely upon theory and research findings from Mercer and others. The consequences of attaching lables like ' mentally retarded to children early in their lives are displayed through a flow chart specifying decisions and alternative consequences and long-term effects	The model of the life career of the exceptional child is made operational as a game board, and players interact with the hypothetical future consequences through playing the simulation game. An excellent simplification of a complex model.
	Toward Walden Two. Basic learning theory principles upon which B.F. Skinner based the utopian community of "Walden Two" is the formal model for this simulation game A "game as reality" paradigm is illustrated specifying the relationship among theory, prediction, reality, the simulation game, and game behavior A flow chart specifies the sequence of simulation procedures, participants' observations, and concept forms are specified; and analysis of outcomes is presented.	A brief summary statement of operant conditioning principles is stated. The application of these principles to a case study of a problem child is very realistic and highly useful in teacher training.
Simulating the Values of the Future	The process of social planning and decision making for the future is simulated in a role-playing task involving prioritizing resources, estimating societal consequences of decisions, and arriving at a moral evaluation of alternative futures when participants are confronted with 20 potential future developments derived from potential developments, including: (1) fertility control; (2) 100-year life span; (3) personality control drugs; (4) incapacitating rather than lethal weapons; (5) sophisticated teaching machine; (6) ocean farming; (7) controlled thermonuclear reactors; (8) continued automation in commerce and industry; (9) artificial life, (10) weather control, (11) general immunization; (12) genetic control, (13) man-machine symbiosis; (14) household robots; (15) preservation of privacy; (16) wide-band communications systems, (17) continued space exploration; (18) advanced techniques of opinion control, thought manipulation, and propaganda; (19) continued trend toward urbanization; and (20) ova/sperm banks.	Empirical anchors exist in the futurist literature for many, if not most, of the alternative future possibilities that constitute the underlying model of possible events. The bias of events envisioned involves advanced technology as major components of the future.
Space Patrol	Although this is a science fiction game, the elaborately detailed tables and charts specify alternative dimensions of characters, equipment, characteristics of their environment (gravity, buildings), artifacts, weapons (fangs, shape-changing), success probabilities, landing zones, encounter (type and degree of surprise), resources, and minerals. A special table is designed for scenario generation.	The model underlying the content is science fiction, and is analogous to the episodes of the "Star Trek" and "Space 1999" television series, and the movie *Star Wars*.

TABLE 8 Models of the Simulations/Games (Cont)

Simulation	Model Characteristics	Evaluation of Models
Hybrid Delphi Game	A simulation of the diversity of real-world viewpoints is conducted through selecting a list of 90 events that could occur in 1996 A.D., placing them on a questionnaire, and having participants assign a numberical desirability index (low 10%, medium 50%, or highly desirable 90%) to the events, and then negotiate a consensus list of 15 most desirable futures within small groups and then within the entire group	The validity of the possible future events can only be determined by comparison with actual future events. The predictions offered for consideration represent a mixture of events that are possible or probable in some cases, and, in other instances, either highly desirable or undesirable events both with a low probability of occurring.
Future Planning Games	Many diverse real-world models and controversial issues underlie these games, including alternative family structures (communal), polygynous, monogamous, same-sex, professional parents, single parenthood); writing a marriage contract; determining national priorities; selecting among capitalist, welfare, or socialist societies; alternative prison models; selecting lifestyle components (materialist, christian, humanist, athiest, guru, hippie) teenager's dilemma of abortion, keeping the baby, or adoption; removal of life support system from car accident victim in coma; prearranging grandpa's funeral, determining crimes punishable by death penalty; constructing an international philosophy based on alternative models (cooperation, competition, cold war, peaceful coexistence, United Nations, regionalism, world law, or protracted conflict models), choosing a social philosophy (capitalist, socialist, reformer, black reformer, radical, conservative); dealing with a civil war in India through neutrality, economic assistance, or military intervention; limiting population through methods of abortion, abstention, free birth control, severe taxation for children, creation of suicide assistance agency, liberalization of capital punishment, execution of nonproductive, free sterilization, free exportation for those giving up citizenship, no assistance to starving, or government education program	The real-world situations that are the models for the games generally have two characteristics: (1) they represent in many cases controversial alternatives, and (2) the alternative considered could be found to have a real-world referent. Although the positions are simplified for the game, enough complexity and reality are retained to permit serious consideration of issues, and lively discussion.
Cope	The classroom becomes Technopolis, a city where students live through five time periods from 2000 to 2040 A.D. Period 1: The city is a leisurely intellectual community whose citizens research the future. Period 2: A computer called COMCON helps with information and material problems and asks citizens to provide human input for problems. Period 3: COMCON, having assimilated all international and intergalaxy computer systems, directs all human activity and requires citizens to learn computer forms and drastically increase their productivity. Period 4. Citizens are forced to learn a new language, FUTURESPEAK, and must compete with COMCON to create ever more sophisticated technology. Period 5 COMCON has grown impatient with human inefficiency, tells citizens that human beings are apparently obsolete, and asks citizens to choose between a life of uncaring bliss or one of constant struggle.	The science fiction model of a computer directing all human activity is an increasingly common theme. The simulation alters real-world events to accelerate change. The simulation of rapid change could be carried out in considerably less time, however. The scenario and procedures have compromised the model to integrate educational experiences, which is accomplished with a reasonable degree of success.
Utopia	Participants consider what they would do if they were subjects in a professor's experiment in an isolated, self-sufficient utopian community of SUNRISE. The group has received unlimited resources for technical, medical, or industrial teams, and individuals have up to one million dollars each. All members must agree to construct an ideal society with moral, economic, tech-	While having educational value in considering alternative futures, the provision of one million dollars to each participant in the utopian experiment removes a substantial degree of relevance to real-world utopian experiments, where the issue of economic viability is crucial.

TABLE 8 Models of the Simulations/Games (Cont)

Simulation	Model Characteristics	Evaluation of Models
	nological, and political components to assure the survival of the society. There are eight subcategories within each of these four areas. Participants conduct research on components of their major systems and draft ideal solutions to problems in each subsystem. The proposed solutions are considered by the whole group, which votes on the principles for their new society. The new society is tested by several crisis situations outlined on the teacher's guide.	
Prospects	This self-analysis program in self-planning attempts to aid individuals in evaluating career and training needs with the intent of producing a plan for implementation in the real world within one to two months. The simulation seeks to prevent obsolescence through having individuals (a) examine their career, (b) evaluate their training needs, and (c) develop specific action plans to maintain and enhance the relevance of their skills.	The model is very close to the reality of career development decisions individuals face, and the simulation provides a highly cost-effective self-help tool.
Edplan	A new budget must be designed by a school board for a school system in a small city in a rural area for presentation and approval by the city council. Participants, acting in the roles of principals, superintendent, teachers' union, student council president, taxpayers, PTA members, school board members, city council, and Federal Aid Representative, act to frame a proposal most responsive to their special interests. The determination of educational policy in the context of a political climate surrounding a financial issue is simulated through a highly interactive simulation involving bargaining, negotiating, lobbying, and voting.	Although simulating the political element in school planning, the model leaves out many significant non-political factors including sufficient time for the development of both a rationale and procedures for implementing the proposed new educational programs.
Edventure II	The game simulates the education market place of the future (1981 to 2000). Learners are able to select from a wide range of options (college, work, self-improvement or hobby-related experiences), and compete with one another to a limited extent in gaining admission to desired courses. In large part, it is a "buyer's market," since potential learners can get just about what they want each year over a 20-year educational venture/life span. The educational model underlying the simulation is the assumption or prediction that increased leisure and higher standards of living will create greater demands for giving education in a great diversity of fields. The design of the game assumes the adoption by 1981 of federal higher education voucher credits which are worth two years' tuition of any full-time course of the part-time equivalent. Participants select courses or work options each year for 20 years and maintain a running tally of consequence outcomes, determining whether or not they have won or lost by the number of satisfaction points generated and/or surplus income and savings accumulated.	Although the simulation requires decision-making and incorporates excellent procedures for providing feedback, the model itself is highly limited, in that the real-world situation being simulated is essentially the decision situation of selecting courses at the beginning of a college semester or quarter. The simulation works well within that limited context.
2000 A.D. Futura City	Central City is an imaginary urban center beset with many problems afflicting American cities presently. The primary task of the game for participants, through acting in roles, is to construct a future city through effective planning and coordination of the development of two land tracts adjacent to the city. Receipt of a federal grant is contingent upon the participants' design of an	The model underlying the game is anchored very well in current urban planning procedures. Although a simplified model, the simulation/game involves high school students actively in many of the decisions and considerations faced by real urban planners.