TOWARD A GENERAL THEORY
OF GAMING

RICHARD D. DUKE
University of Michigan

Humankind is a little harried of late. The naked ape barely blinked only to discover that his animal being has moved from the cave to the moon with precious little time for adjustment, measured in evolutionary terms. It is difficult to derive a valid "alienation index" for a society, perhaps impossible for different points in historical time. Nonetheless, evidence abounds that all is not right with Western civilization as it is currently structured; further, the situation has deteriorated markedly in the past quarter century. The tune-out, drop-out, cop-out syndrome is ever apparent although the recurrent waves of enthusiasm (e.g., populist activity in environmental concerns) give reason to believe all is not lost. But even in such cases where enthusiasm is high and a general sense of urgency and

responsibility exists at the level of the individual, there is pervasive frustration. The individual needs to be part of those processes affecting his life, but is currently devoid of any effective means to alter things or join the dialogue about potential change. This situation reveals some dimensions of life today that were not previously true:

- The problems of today are infinitely more complex, involving systems and interacting subsystems that go beyond normal human ken and which do not yield to conventional jargon or traditional forms of communication.

- The sheer quantity of individuals who want to be effectively part of the dialogue is large and growing rapidly.

- There is a growing personal urgency because the solutions pursued today constitute a more pervasive intrusion in the individual's life. (In earlier times the king's men may have come periodically for the taxes, but in the interim period, life was constrained only by the elements and by whatever circumstances might exist within a personalized clan; today, the Internal Revenue Service comes every week and unknown Big Brother, in a thousand ways, constrains the daily actions of our lives.)

This situation, of course, is not new. Without too much difficulty man's struggle for the personalized control of his life can be traced through the Magna Carta and the decline of the king's power to the Parliament to the Declaration of Independence and resulting constitutional governmental forms (whose painfully won gains are now threatened by a technical aristocracy, the high priests of 1984). Even the great urban political

bosses performed a valid personalizing influence buffering the citizen from the emerging systems and technologies that must control his world. (Sadly, only vestiges of this humanizing function remain: witness the light years between the individual and national politics—can it be other than Alice in Wonderland with spy versus spy, body counts from a constitutionally nonexistent war, complexity of domestic programs that boggle the expert mind while dominating in strict inverse relation the lives of the least able citizenry?)

At the very moment when man seemed to have garnered the power to control his personal destiny by his own hands, he has been caught unawares of the grinding pincers movement of the complexity of societal survival in modern times and the inevitable technological response. This crunch has been on its way since the industrial revolution, but its very rapid progression was precipitated by World War II, in particular by the spinoffs in computer technology and the resultant elaboration of the concept of "systems" and related, evolving technologies. Now the high priests of technology speak only to the high priests of technology, God is dead, and the citizen, no matter how strongly motivated, can hardly get a word in edgewise.

Problems of the management of modern Western society (and in a particular sense the great urban centers) have generated the modern equivalent of the biblical Tower of Babel: to unravel the present "want structure" in human terms, to harness appropriate technologies, and to manage a successful communications net (non-net?) that is truly unimaginable and certainly unmanageable. Society's failure to respond to individual need is, in large part, a communication problem.

Is there any remote possibility of establishing a real dialogue about this multifaceted, dynamic gargantua, even among the elite, substituting future time-frame for future time-frame in advance of reality, permitting positive management to replace a negative reactionary reality? And is there any way to enlarge the dialogue to include the activist citizen or someone who might conceivably be called his "representative" in that he transmits a personal translation of ideas for his limited and personally known constituency?

Of course not, not if we insist on restricting ourselves to the languages of the caveman.

But there is hope that the possibility for a quantum jump exists; that communication can move from its rigid and limiting sequentiality to a gestalt mode, and that this supralanguage can be used as a simultaneous translation for our modern Tower of Babel.

THE NEED FOR A FUTURE'S LANGUAGE

"Future shock" has become part of the popular lexicon. Alvin Toffler in 1970 introduced the concept in a book by that name in which he stresses the death of permanence and the coming of the age, not of Aquarius, but of transience. The book documents in detail his thesis that the world of tomorrow will be significantly different from the world of yesterday along many dimensions. Toffler quotes from Kenneth Boulding:

> As far as many statistical series related to activities of mankind are concerned the data that divides human history into two equal parts is well within living memory. The world of today . . . is as different from the world in which I was born as that world was from Julius Caesar's. I was born in the middle of human history, to date, roughly. Almost as much has happened since I was born as happened before.

In order to place gaming as a communication form in proper perspective, consider Figure 1, which depicts the pattern of accelerated change postulated by Toffler and others. The horizontal axis would represent centuries starting perhaps with the year 0 in our current system of counting; the vertical column would represent an index which would attempt to convey complexity, transience, and rate of change confronting the typical citizen. Using a logarithmic scale a curve is plotted which attempts to illustrate this change (perhaps the number of new things which must be assimilated in the lifetime of a given citizen). The curve would start in the extreme lower left hand

corner and be virtually a straight line with a straight incline upward, barely perceptible, until perhaps 1900; incremental jumps might be noted at the time gunpowder was introduced and certainly as the industrial revolution impacted on society. The curve turns vertical during the period 1900-1940 with a sharp increase during the period of World War II. Subsequent to World War II the curve would be increasing at a near vertical rate implying change flowing on change at a totally unprecedented rate. Curiously a number of authors have independently noted World War II as being the approximate time of the pivot from the trend line through antiquity to the modern trend line.

Virtually all our language forms have come from antiquity and have sufficed, in spite of their sequentiality, because they rely heavily on analogy and the analogies employed are predicated on historic circumstance which is not expected to change, by minor adjustments through time. Note that the curve implies in the post-World-War-II period a situation far more involved, particularly in the several dimensions of complexity, future orientation, thoughtful consideration of alternatives, and the inevitable recognition of the nature of systems and interlocking subsystems which are affected. Necessity is the
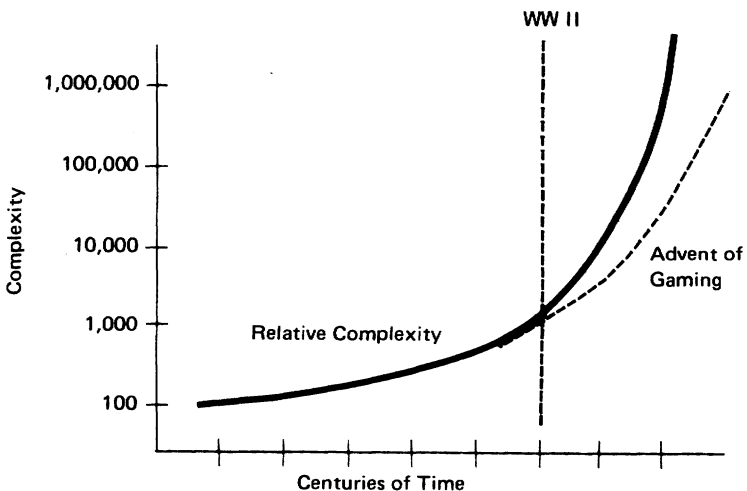

Figure 1.

mother of invention, and the post-World-War-II period has shown many innovations which attempt to deal with this communications problem—each reflecting an attempt to convey gestalt, or at least to escape from the harsh burden of strict sequentiality of the written and spoken language forms. If one were to plot the advent of gaming as indicated by the new games which appear in various cataloging efforts, the curve mimics rather accurately the curve of accelerated change with perhaps a ten or fifteen year lag. This reflects, in my judgment, a spontaneous solution, "gaming," by many people in many problem situations to the problem of developing a gestalt communication form. In short, we have a new language form, a language form which is future oriented. If this premise holds, to date we have seen no general statement or theory which would explain the wide diversity of materials which appear as games, or which might guide the neophyte in efforts to develop effective games for their own communication purpose.

The need for conveying holistic thought, or gestalt, is urgent; the coming decade will increase this urgency considerably. Perhaps the most trenchant statement on this need is by R. F. Rhyne (1972). While describing the need for holistic communication, Rhyne states "There is a Macro problem, an interweaving of adverse conditions that is more extensive, more richly structured by interior lines of interaction, and more threatening than any circumstance faced before by all mankind." Rhyne's article was formulated "to stimulate exploration of the means whereby appreciations of complex wholes may be more quickly and more reliably told to others." He, too, rejects our ancestral language forms as being inadequate to the task and argues that new forms must be invented. Arguing that decision is a gestalt event and not a logically determinable process, he believes that the citizen or the policy researcher or other decision maker must first comprehend the whole, the entirety, the gestalt, the system, before the particulars can be dealt with. Rhyne suggests a variety of approaches to this problem and alludes to games as having a particular potential.

We learn through games because, if properly designed, they represent abstract symbolic maps of multidimensional phe-

nomena which serve as a basic reference system for tucking away the bits and pieces of detail which are transmitted and in particular, by assisting in the formulation of inquiry from a variety of obtuse angles or perspectives which are meaningful to the individual making the inquiry and which can only be transmitted through an n-dimensional, abstract, symbolic-mapping procedure. If the prior observations on the character of change in the world since World War II are valid, they could perhaps be summarized as follows: prior to World War II the need for pragmatic information and fact, learned by rote, was imperative; in the new era the need is urgently for the acquisition of heuristics or a flexible set of highly abstract conceptual tools which will let the participant view new and emerging situations, having no precedent, in a way that permits comprehension. We learn through games, then, because it is a relatively safe environment which permits the exploration of many perspectives chosen by the individual, expressed in the jargon of the individual, and subject to fairly prompt feedback in "what-if" contexts. These concepts gain strength when reviewing the work of Moore and Anderson (1969) as they conduct research on learning environments. Curiously enough, they pinpoint the time of change in society as being dramatically correlated with the decade of the forties. Properly designed, games have a strong basis in learning theory, which supports their potential as a communication form.

The simultaneous invention of games of a wide diversity of subject matter and technique is a response to a felt need for an improved communication form to deal with problems of gestalt or holistic thought. Just as the folk models alluded to by Moore and Anderson (1969) emerged in a societal context as needed, games become a modern equivalent.

GAMING—A FUTURE'S LANGUAGE

For the moment, let me identify seven basic requirements that must be met by any future's language:

(1) The ability to convey gestalt or holistic image.

(2) The ability to permit the specification of detail at any appropriate level, in the context of the holistic image.

Complex System	Reality

Perception

Reality as Perceived by Designer	Perceived Reality

Process of Abstraction

Model of Reality	Conceptual Map

Supersymbols	Conventions	Symbols	Conventions

Game-Specific Language	Conventional Language

Communication Technologies	Languages

Hybrid Form of Communication Technology	Supra-Language (game)

Gestalt Communication Process Through a Gaming Environment

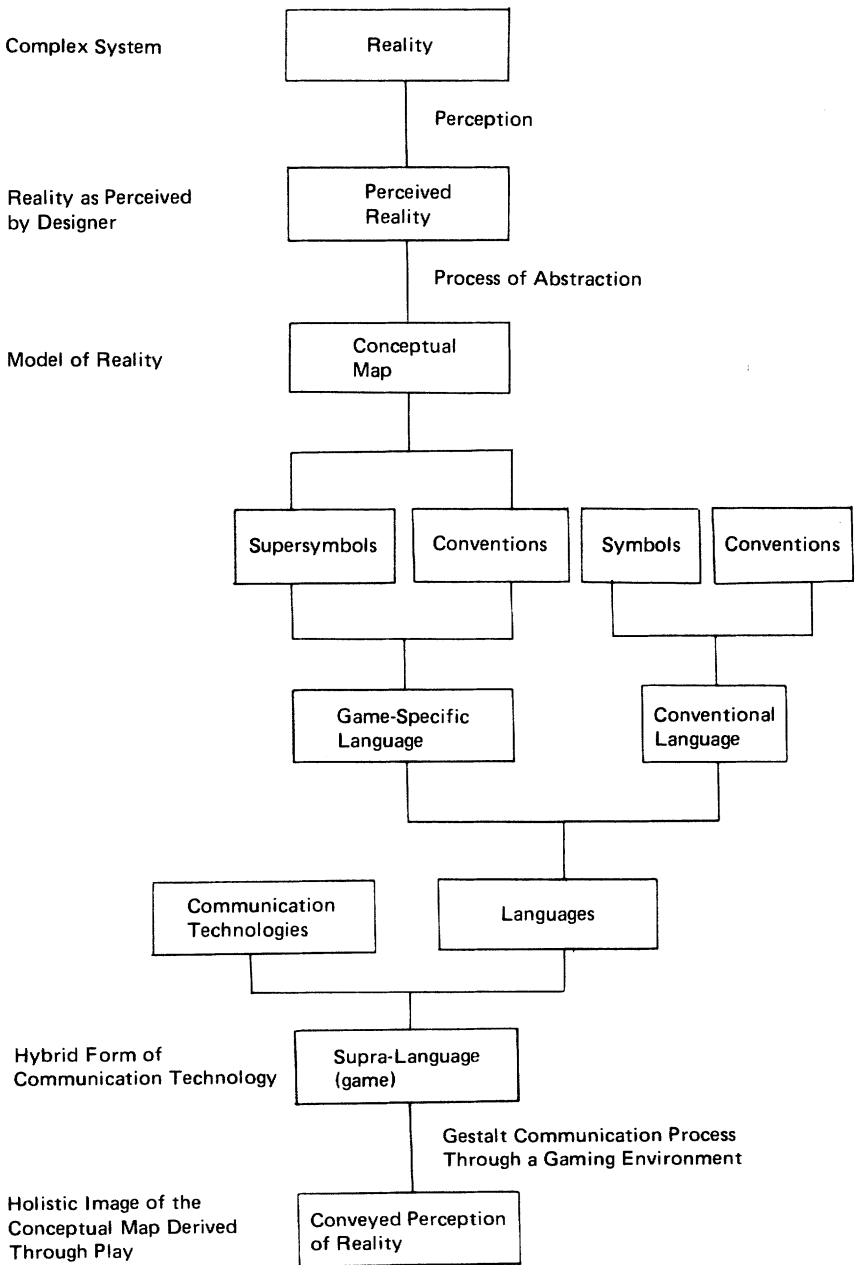| Holistic Image of the Conceptual Map Derived Through Play	Conveyed Perception of Reality

Figure 2: CONVEYING COMPLEX SYSTEMS

(3) A structure permitting the pulsing of specific, tangible inquires or alternatives to permit correlation with the holistic image and any significant detail.

(4) The ability to display, make explicit, or permit the recording of explicit linkages between major segments of the holistic imagery; the creation of an awareness of feedback.

(5) A nonelitist, universal possibility for use; a basic catholicity of design.

(6) A future orientation (implying any time frame past or future other than the present).

(7) A basically transient format to permit the restructuring or more careful articulation of the problem as viewed by those participating.

While gaming is not perceived as "the" future's language, games can—if certain rules, concepts, or principles are employed consistently—meet the basic requirements of a future's language in a wide variety of situations.

Figure 2 formulates the rationale for the game as a "supra-language." A language is defined as a symbol set and the conventions governing their use. A supra-language is defined as a hybrid consisting of one or more conventional languages and one game-specific language. The game-specific language implies the need for the development of an explicit symbol set appropriate to the context of the game as well as the rules governing the use of these new symbols. In game design, careful attention must be devoted to the precise formulation of this game-specific language, and care must be taken to convey it thoughtfully and early to the game participants. Only then will they share a vernacular which permits them to jointly share an investigation of a complex system. The game, then, which has as its objective to convey complex reality, has as its result the conveyance of an imagery which may be close to, or distant from, reality; therein lies an excellent device for evaluating a game after construction. Figure 3 is a consolidation of the elements which are being advanced as the logical components of a general theory of gaming and game design.

Time will not permit a careful exposition, but the main theme can be advanced. First, the character of the problem

must be stated in communications terms. This problem must be interpreted against the "communications continuum" to verify that a less specific and therefore less costly communication form cannot be employed in lieu of a game. If thoughtful review indicates that the gaming medium is appropriate, we then advance to the game design process. Most game designers approach their problem as though it were a confused multidimensional simultaneous equation. The result is an elongated process and sometimes a confused product. The game design process is itself relatively straightforward and may be more or less complicated than the illustration might suggest, depending on the problem at hand and the character of the game being developed. Nonetheless, the game designer is well advised to make a preliminary pass through the entire process at least intellectually to sort things out before attempting game construction. The game components in the lower left hand side of the chart have an approximate correlation with grammar in the context of spoken or written English. In particular, the symbolic structure employed is a very significant decision on the part of the game designer. If it is too complex, the audience may be lost; if too simple, the audience may be put off or not able to comprehend the nature of the basic system. If the symbolism employs terms in conventional use in an attempt to convey new ideas there will be a built-in distortion which will slow the progress of the game and which may or may not ultimately be overcome. Games are iterative in nature, and the procedures for play must be clear both to the game designer and to the participants. Mechanics are somewhat flexible and should be differentiated from rules which must be constant. Scenario, of course, implies a substantive content and may be a replaceable element in the instance of frame games.

The repertoire of techniques illustrated in the lower right hand corner is intended as a systematic structure which will enable the neophyte game designer to evaluate or interpret existing games in a systematic fashion. The particulars of any given game will vary tremendously in style, technique, and paraphernalia; nonetheless, any game can be interpreted through the characteristics which are presented.

DEFINE THE COMMUNICATION PROBLEM

WHO IS THE CLIENT?
WHAT IS TO BE THE CONTEXT OF USE?
WHO WILL BE THE PARTICIPANTS?
    WHO WILL PARTICIPATE AS SENDER?
    WHO WILL PARTICIPATE AS RECEIVER?
    WHO WILL PARTICIPATE AS OBSERVER?
WHAT IS THE PRIMARY COMMUNICATION PURPOSE?
    DIALOGUE
    PROJECT
    EXTRACT
    MOTIVATE
WHAT SUBJECT MATTER, IF ANY, IS UNDER CONSIDERATION?
WHAT RESOURCES WILL BE AVAILABLE FOR DEVELOPMENT AND USE?

SELECT THE MEDIUM APPROPRIATE
TO THE COMMUNICATION PROBLEM

WHAT ARE THE CHARACTERISTICS OF THE MESSAGE(S)?
    EXAMPLES: QUALITATIVE/QUANTITATIVE/PRECISE
            SUBTLE/AMBIGUOUS/INTANGIBLE
            TIME CONSTRAINED/PERMANENT
            SEQUENTIAL/GESTALT/ANALOGY/COMPLEXITY
REVIEW THE CHARACTERISTICS OF THE VARIOUS MEDIA
    SEE #3- COMMUNICATION CONTINUUM
WHICH MEDIUM BEST FITS THE PROBLEM?
IF GAMING-SIMULATION IS THE CHOICE, PROCEED TO GAME DESIGN PROCESS

COMMUNICATION CONTINUUM

MEDIA / CHARACTER-ISTICS	PRIMITIVE		ADVANCED				INTEGRATED		
	INFORMAL	FORMAL	SPOKEN	WRITTEN	EMOTIONAL	TECHNICAL	MULTI-MEDIA	GAMING	REAL
SEQUENTIAL-GESTALT	MOST CONSTRAINED BECAUSE OF SEQUENTIAL NATURE		BASIC CHARACTER IS SEQUENTIAL BUT VARIOUS DEVICES EMPLOYED TO EASE CONSTRAINT				HIGHEST GESTALT ABILITY SHORT OF REALITY	FULLY GESTALT BECAUSE ACTUAL REALITY	
SPECIFICITY UNIVERSALITY	EMPLOYED FOR ALL SITUATIONS BUT LIMITED IN MATERIAL CONVEYED		STANDARD UNIVERSAL MODES SELECTIVELY EMPLOYED TO MEET SPECIFIC COMMUNICATION NEED				MORE SPECIFICALLY TAILORED TO COMMUNICATION NEED	SPECIFIC	
SPONTANEITY OF USE	NATURAL, EASY, CONVENIENT		SPECIAL SKILLS REQUIRED SOPHISTICATION OFTEN ACCOMPANIED BY DRYNESS ARTIFICIALITY OF USE INHERENT				SPECIAL EFFORT TO INITIATE; THEN SPONTANEOUS USE	NATURAL "LIFE" FORM SKILL LIMITS INVOLVEMENT	
CHARACTER OF CONVENTIONS	RELATIVELY FEW SIMPLE, INFORMAL		FORMAL & INFORMAL, SIMPLE & COMPLEX HIGHLY STRUCTURED MANY				MANY UNIQUE TO EACH SITUATION FAIRLY COMPLEX	MANY, INFORMAL, COMPLEX	
CHARACTER OF CODING+DECODING	NONE REQUIRED OR SIMPLE EFFORT		ESSENTIAL, MAY BE ELABORATE AND HIGHLY SPECIALIZED				ELABORATE CODING TO INITIATE; SIMPLE EFFORT BY USER	NONE REQUIRED	
CHARACTER OF MESSAGE THAT CAN BE CONVEYED	ONLY RUDIMENTARY MESSAGE		SOPHISTICATED MESSAGES				GESTALT SUBSTITUTE FOR REALITY	REALITY	

Figure 3: GAMING: THE FUTURE'S LANGUAGE*

*This figure is taken from a chart in Richard Duke's forthcoming book **Gaming: The Future's Language** (1974). A 24 x 36-inch copy of the chart is available at $1.00 from the publisher—Sage Publications, Inc., 275 South Beverly Drive, Beverly Hills, California 90212. (Orders from the UK, Europe, the Middle East and Africa should be sent to Sage Publications Ltd, St George's House, 44 Hatton Garden, London EC1N 8ER.)

GAME COMPONENTS

Figure 3 (Continued)

GAME DESIGN PROCESS

Figure 3 (Continued)

INTERPRETIVE CRITERIA

BASIC INFORMATION
- TITLE
- DESIGNER
- DATE
- DESCRIPTION-SUBJECT
- PURPOSE
- INTENDED USE
- SPACE REQUIREMENTS
- COMPUTER REQUIREMENTS
- OTHER MEDIA REQUIRED

KIT AVAILABILITY
- COST
- SOURCE
- PORTABILITY
- KIT PARAPHERNALIA
  - STANDARD or CUSTOM-MADE
  - DOCUMENTATION
  - MATERIALS and QUANTITIES

PARTICIPANTS
- AGE RANGE
- HOMOGENEITY
- PRIOR KNOWLEDGE
- SOPHISTICATION
- NUMBER

PLAYER INVOLVEMENT
- PLAYER ORGANIZATION [TEAM, COALITION, INDIVIDUAL]
- EMOTIONAL/ INTELLECTUAL
- ACTIVE/ PASSIVE

TIME
- DURATION OF PLAY
  - INTRODUCTION
  - INERTIA
  - FLYING
  - CRITIQUE
- PREPARATION TIME
  - PLAYER
  - OPERATOR

CONTENT
- STEPS OF PLAY & PLOT OUTLINE

DYNAMICS OF PLAY
- PLAYABILITY
  - LEVEL OF ABSTRACTION
  - GAMINESS
  - COMPLEXITY NUMBER OF VARIABLES, INTERACTIONS DECISIONS, SUPERSYMBOLS, MODELS, DECISION-MAKERS
- FLEXIBILITY
  - ALTERNATIVE SCENARIOS
  - ISSUE GENERATION
  - CHANGING SUBJECT MATTER [FRAME GAME]
  - OBSERVABILITY

EVALUATION
- DOES THE CONCEPTUAL MAP CORRESPOND TO REALITY
  - IS THE CONCEPTUAL MAP EXPLICIT, IMPLICIT OR INTEGRAL?
  - WHAT IS THE THEORETICAL or EMPIRICAL BASIS?
  - IS THE GAME MESSAGE ACCEPTABLE?
  - IS THE GAME MESSAGE VALID?
  - IS THE MESSAGE APPROPRIATE TO GAME'S PURPOSE?
- WAS THE TRANSLATION INTO A GAME SUCCESSFUL?
  - WERE VALID CONSTRUCTION PROCEDURES EMPLOYED?
  - WERE APPROPRIATE GAMING TECHNIQUES APPLIED?
- IS THE PRODUCT ACCEPTABLE?
  - IS THE SYSTEM GESTALT CLEAR?
  - IS THE SYSTEM RESPONSIVE TO PLAYER ACTIONS?
  - IS THE CONCEPTUAL MAP CONVEYED AS INTENDED?
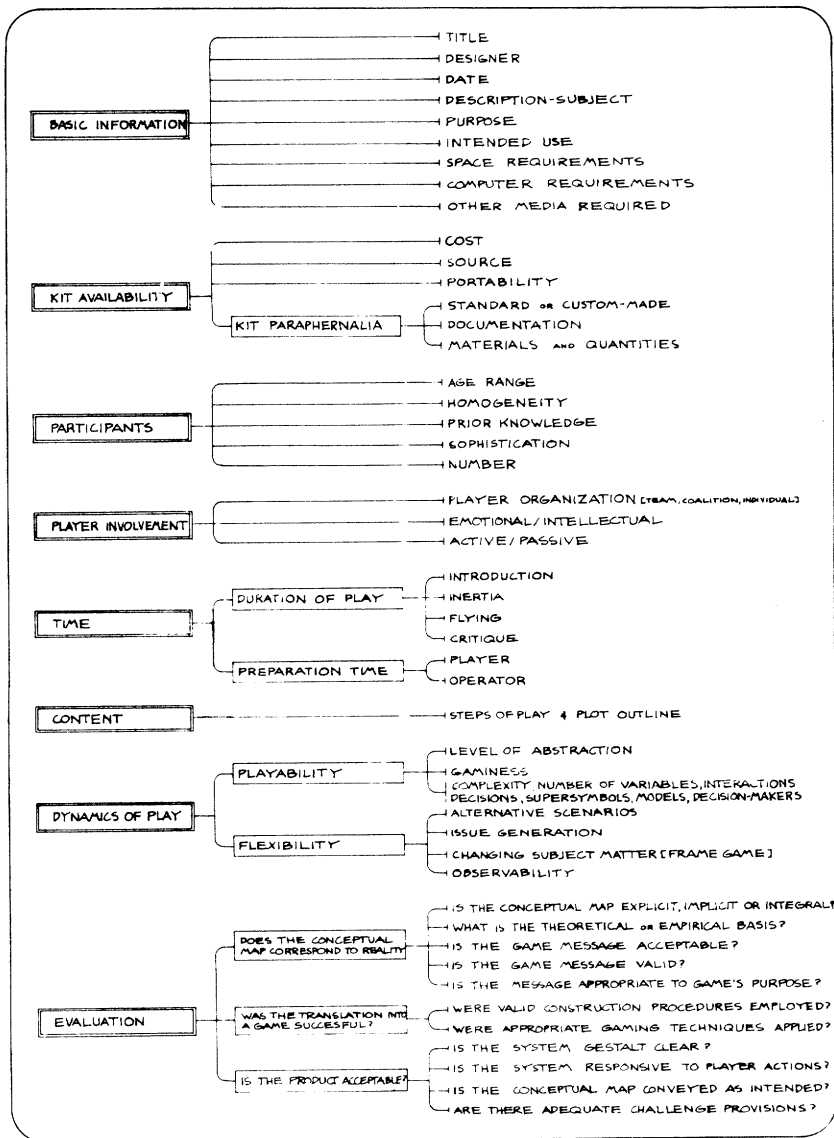 - ARE THERE ADEQUATE CHALLENGE PROVISIONS?

Figure 3 (Continued)

[144]

Figure 3 (Continued)

The upper right hand corner illustrates interpretive criteria. The suggestion is made that the time is at hand for gamers to adopt a set of conventions which require the designer to present in orderly fashion a basic set of information which would be useful to the potential user as a way for speculating on the character of the game prior to play. Contrast the conventions currently in use in conjunction with "book" to the enormous disarray of "game." The consistent format of "book" which has emerged over a long period permits the ready and quick interpretation of the book for its potential to the user; the average game today is a morass which is unintelligible to the potential user until completion of play.

Finally, some basis for evaluation should be formulated by the game designer and explicitly included in each game product. This evaluation would require an explicit statement on the part of the designer explaining the reality which the game ad- ddresses, and explicitly an abstracted form of that reality (conceptual map) as interpreted by the designer in the construction of the game.

CONCLUSION

These thoughts are offered in the most tentative fashion, in the hope that they will prompt a dialogue leading toward the development of a general theory of gaming.

The want of an organized, generalized perspective which adequately accounts for the incredible diversity of games is and will remain an impediment to their intelligent use. While several perspectives have been in vogue, they inevitably account for only a small segment of what we generally refer to as games. The time has come to wrestle with this problem.

REFERENCES

MOORE, O. K. and A. R. ANDERSON (1969) "Some principles for the design of clarifying educational environments," in D. A. Goslin (ed.) Handbook of Socialization Theory and Research. Chicago: Rand McNally.

RHYNE, R. F. (1972) "Communicating holistic insights." Fields Within Fields Within Fields 5, 1.

TOFFLER, A. (1970) Future Shock. New York: Random House.