DESIGNING THE METHOD

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Edited by David K. Tester

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A tribute to Mathew Nowicki, whose architectural career was suddenly terminated when he died in an airplane crash, marked the beginning, in 1951, of the Student Publication of the School of Design. Since that time, annual issues have addressed a variety of topics in the fields of architecture, landscape architecture, urban planning, product design, and visual design. At times, the publication has documented, through drawings and writings, such noted designers as Le Corbusier, Alvar Aalto, Louis Kahn, Paulo Soleri, and Harwell Harris. In addition to the work of student and faculty in the School of Design, other volumes have contained the work of Buckminster Fuller, Mies Van der Rohe, Richard Neutra, Pier Luigi Nervi, Charles Eames, James Fitch, Eduardo Catalano, and Duncan Stuart. More recent issues have reflected increasing concerns for ecological psychology, community development, and related research, with reports by Amos Rapaport, Kenneth Craik, David Stea, Raymond Studer, Murray Milne, Stanley Cohn, David Godschaulk, and Avery Johnson. This issue is concerned with a related issue: the development and use of new design strategies for eliciting usable information from non-designers for application to specific design contexts.

As the title implies, the Student Publication of the School of Design is entirely organized and staffed by student volunteers from different departments within the school. Content of each issue is determined by the editor. Working with the assistance of a faculty advisor of their choice, the staff prepares the material for printing, distributes issues to students, and maintains the international mailing list. Financial support is provided by student fees, the sale of issues, and donations: Benefactors $100.00 per year, Patrons $50.00 per year, and Donors $20.00 per year. The Student Publication is no longer available by subscription. Issues are announced when they are ready.

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INTRODUCTION

There is a growing realization of the need for new strategies to solve increasingly complex problems in the built environment. Rapid urbanization, accompanied by changes in goals, values, and technology, have resulted in changes in people's environmental needs and aspirations in such areas as education, housing, health, transportation, and recreation. In attempting to reconcile rapid growth, it has become apparent that solutions to architectural and planning problems, whether buildings, city blocks, or communities, should not be viewed as isolated physical objects; rather, they should be perceived as integral parts of an environmental system, with economic, social, and political ramifications. Viewing the built environment as a set of interrelated systems which provide for man's needs, it is evident that a change in one subsystem might modify elements of another subsystem, with unpredictable consequences. Nevertheless, the importance of considering this broader context is necessary when one subscribes to the view which integrates the built environment with other systems.

Previously, designers have relied on their own intuition to formulate solutions to design problems: the statement of objectives, selection of priorities, and the determination of physical form. Solutions were determined according to designer's own experiences, attitudes, and preferences, and were viewed as holistic entities. Assumptions about the activities and preferences of the future users of the environments were made according to the designers' values which were transferred directly into physical solutions. It became apparent that problems confronting architects and planners were rapidly becoming more com-

plex, and more rigorous methods were necessary to cope with increasing amounts of information. Similarly, the risk of errors had potentially deleterious consequences.

In the late 1950's and 1960's, efforts were made to find new methods whereby the complexity of problems in the built environment could be addressed. The greater degree of complexity was a result of looking at design problems in their larger environmental context as well as the increasing scale of institutional problems. With the realization that more rigorous methods of problem-solving were necessary, investigations were directed into operations research and management sciences for more scientific methods. Computer-aided design techniques were used to manipulate variables according to specific criteria, and computer graphics suggested optimal schematic solutions. Systems engineering techniques were used to insure internal and external compatibility of the sub-systems. Statistical methods were used to identify patterns in environmental data useful in making design decisions. Mathematical models and matrices were also adapted for the identification of various components and their connecting links. Such techniques as brainstorming and synectics sessions were implemented to explore design problems and to generate new ideas. Interests in such processes resulted in the formation of the Design Methods Newsletter, which was initiated as a forum for communications.

Simultaneously, other interests developed in the substantive aspects of the relationship of man and the physical environment.Research in the man-related sciences was redirected, with the objective of integrating findings with the human impact on the built environment. In an effort to achieve more appropriate designed environments, members of this multi-disciplinary group, known as the Environmental Design Research Association, (EDRA), began to study man's

behavior, the quality of the environment, and environmental attributes. With the acknowledgement of important differences in values and resulting differences in environmental preferences, studies were conducted to elicit a better understanding of attitudinal responses to the environment and of the nature of user's perceptions about environments. Attempts were made to evaluate user response to recently built environments, as a basis for prediction of human behavior in future environments. Such research techniques as interviews, questionnaires, observations, simulated environmental experiences, scaling devices, and diagrammatic sketches were used to elicit user response. New decision models and problem solving methods were devised, tested, and evaluated. While such techniques provided and structured a great abundance of information, a major problem still existed: the resulting solutions were still the product of the designer, based on his understanding of each situation. While perhaps responding to more issues related to the built environment, a new renaissance designer emerged, one who was possessed with an even greater expertise than ever before.

Recognition of the limits of previous environmental design research and similarly introspective orientation of design methodology has led to a major conceptual leap: the revision of design decision processes. The necessity of redefining the relationship between designers and user groups has required the design of new strategies for analyzing environmental problems. The realization that environment-related knowledge does not exist exclusively in designers has led to the development of argumentative processes whereby user groups and designers can make the decision process objective, leading to environmental design solutions which directly reflect the user's values. These strategies designed specifically for environmental design, mark a transition between the parting of social science research methods and the development of design methods. Some of the strategies define the relationship of various aspects of the physical environment, some identify the linkage

between abstract goals or objectives and corresponding alternate environments, while others enable the formulation of schematic models. Only through the implementation and testing of such strategies can an expanded role of designers be developed.

This volume contains the pioneering work of innovative designers attempting to implement the conceptual leap in the role of designer as educator and facilitator. Since this new direction is largely embryonic, designers conceive the implementation of the developing approach in several different frameworks and they see it occurring on several different frameworks and they see it occurring on several different scales. In the first paper, Chris Jones suggests that a fundamental philosophical inadequacy of earlier methodologies is that designers have been much too concerned with buildings, and not concerned enough with providing for effective change in the quality of life of other people in the built environment. He suggests that designers relate the processes by which they have made their own lives pleasant to other people who can use these processes to improve their life patterns. In an attempt to plan and produce such change on a large scale, Edward Matchett and Anthony Blake have been testing and developing their strategy, called logosynthesis. By bringing together an interdisciplinary team, the user group, their strategy aims at developing a more powerful 'group mind', linking together not only professional knowledge, but also such intangible areas as personal experiences, aspirations, and spiritual activities. From this group mind, they suggest, can arise innovative thought patterns, which lead to effective plans for change.

Some strategies may be designed which, while affecting the quality of life of the people, may not obviously affect the built environment. J. Wood's effort to devise objective strategies led him to apply two systematic design methods simultaneously. Used previously in the field of product design, Mr. Wood's strategy enables the cooperative de-

velopment of a pension and life insurance policy plan by those members who would be responsible for its economic success, considering simultaneously the management, marketing, and client positions.

Implementing the negotiative process among user groups becomes more obviously related to the quality of the built environment in an overlay space-planning technique developed by Don Grant and Art Chapman. Resulting in a land use plan, the process, which is sequential, adaptive, and user-educating, aims at resolving conflicts of interest among clients who want land allocated for completing uses. A different aspect of planning is investigated by L.A.E. Breto-Flores. The S.A.U.C.O. game was designed to study the redevelopment process in Latin America, including an exploration and analysis of the social, economic, and political problems which arise during implementation of a redevelopment program in an urban Latin-American community. Participants of this simulation collectively design an urban renewal project for an existing community of 40,000 people. Also concerned with the residential planning aspects of the environment, Hanno Weber and a group of architectural students devised a community decision-making process. Realizing that an understanding of the residents' social structure and cultural values was essential in order to design for physical life patterns, the designers worked with a community task force to determine residents' perception of their community needs, built space, private and common open space, and vehicular areas and storage, by identifying choice options and enabling trade-offs to occur. They report the solution to be logistically unconventional.

New approaches for implementing user-oriented programming have also been developed. Michael Pyatok, assisted by architectural students, devised a two phase gaming strategy which results in a building program after a period of negotiation and argumentation between the school board, citizens, teachers, and architects. This group, in which each person

represents a specific interest group, first decides on educational objectives, then identifies major educational programs, supportive events, and the necessary environmental characteristics. Finally, it develops a three-dimensional schematic model. Henry Sanoff and George Barbour tested a strategy using several techniques to help a multiple-user group plan the development of an alternative school. The setting for the planning strategy was a brief, intensive charrette, bringing together parents, teachers, children, board members, consultants, and designers for several days of intensive planning. Using collaborative poems, semantic rating scales, archetype drawings, and role playing, they collectively developed a list of educational objectives and chose appropriate activities and learning methods to fulfill these objectives. A user-oriented building program was the product of this charrette.

The current concern with integrating the user into the design-decision process has resulted in a new application of gaming techniques. Such gaming aids are tools which enable user groups to provide designers with specific choices concerning particular aspects of the built environment. Gaming aids may provide user groups with sets of possible objectives, activities, and environmental settings, with a set of rules which define the relationship of the different components. With such aids, a diverse user group can negotiate conflicting interests which may arise due to differences in their values and experiences. Through discussion, preferences can be stated and consensual agreements can be reached. The Community Development Group in the School of Design, North Carolina State University, has been developing and testing games for several years. Three examples are included here to demonstrate the nature of the games and possible variety of uses for specific environmental concerns. Systematic Evaluation of Architectural Requirements for Community Housing, (SEARCH), is a tool for user-identification of inter- and intra-residential characteristics. By identifying the range of choices available, from interior dwelling layout to site plan, and including residential image, designers

can determine user's preferences on several different scales of the environment. In a similar manner, Planning Outdoor Play, (POP), enables parents, teachers, and children to make design decisions about an outdoor play area which provides for children's development, in areas other than the physical. Relating Objectives for Learning to Education, (ROLE), shows the relationship between and range of choices of learning objectives, learning methods, and environmental settings.

The concern for experimental methods such as these included in this volume is indicative of the validity and importance of new designer-user-roles. The range of environmental issues that can be addressed in this manner goes beyond the case studies presented here, and the specific applications included do not necessarily represent the only or optimal approach to a specific design problem. It is intended that, by example, these strategies can provoke further research and application.

David K. Tester, Editor

TO BE A PART OR WHAT IS A SECOND GENERATION METHOD?

Chris Jones

Chris Jones has attended various schools, colleges, and universities in both sciences and art. A graduate of Cambridge, he is a founder-member and past chairman of the Design Research Society. Mr. Jones has lectured extensively in most European countries, the United States, Japan, and at many British universities and colleges. The author of almost one hundred publications on design, ergonomics, futures research, and most notably, Design Methods, Chris Jones has become an internationally known scholar. Mr. Jones is presently serving in the capacity of Professor of Design at the Open University in Buckinghamshire, England. He is currently studying experimental music, films and poetry, and is attemping a book on industrial life.

TO BE A PART
OR WHAT IS A SECOND GENERATION METHOD?

Henry Sanoff said something that begins to answer this question. He pointed out that the organizers of the EDRA[1] Conferences have each year tried to make it different from conventional conferences, less ponderous, more human, etc. But each year it turns out just like every other conference. " 'Why,' he asked, 'can't designers design a conference?' " A good question.

Since our conversation, I keep remembering his words and at last I have what feels like an answer: "Because they are IN IT." Is it that design skills and methods as we know them are suited only to the designing of objects outside of ourselves and that a new kind of method is needed if the level of designing is raised from objects to activities?

To design an event of which one is a part, an activity one is going to live oneself, sounds exactly like deciding what to do in life anyway. So designing becomes a way of ordering life, or remaking a culture while living it.

The following poem came to me by the seaside last year. It is one way of stating the idea that what is good about architecture is not the buildings designed, but the sensitivity and skill with which architects learn to make their own lives more pleasant than most people's, given the same

1 Environmental Design Research Association

resources. It seems to me that this sensitivity and skill should be part of everyone's education. If this is so, then, architectural teachers should stop teaching a minority how to design buildings and begin to help all people to improve the design of the life-pattern of which they are parts. But, as Henry Sanoff said, "Designers cannot design a conference." Why not?

O architects
drop the Capitals.
Your general skills
not so special
are needed now
for the architecture
of living
modestly
or Immodestly
in the spaces
between.
So teach
what you do
and learn
what you miss
when you squeeze your talents
into
those misplaced walls.
Be a party
to living
outside
the schedules
of accommodation.
Open your minds
to children:
leave the buildings
to chance.

LOGOSYNTHESIS: THE HOLISTIC APPROACH TO CREATIVE DESIGN

Edward Matchett and Anthony Blake

Edward Matchett is the founder and director of Matchett Training, a training and consulting unit based in Bristol, England, which specializes in accelerated professional and executive development, based on the controlling of live thinking. He is best known as the originator and chief exponent of Fundamental Design Method, a meta system for controlling and developing highly disciplined, yet highly personalized thinking, particularly thinking needs for solving complex open-ended problems, e.g. business strategies and creative design. His work in design methodology has resulted in major changes in the thinking of individuals and organizations around the world. The U.K. Atomic Weapons Research Establishment's Problem Analysis by Logical Approach System and the Royal Navy's Methodical Analysis for Use in Design system are two offsprings of his early work. His most recent and comprehensive design system is named "Logotechnology" and concerns the directing of technology so as to increase its meaning-context and overall appropriateness in a total-country or total-world setting. Mr. Matchett is currently working with chemists and physicists on programs concerned with developing a new range of materials.

Anthony Blake studied Physics and the History and Philosophy of Science at Cambridge, England. He has experimented with small group thinking processes at various technical colleges and participated in the development of structural communication techniques on training. He has served as a management consultant to many large firms, and developed leadership training materials for the U.S. Naval Academy. Moving gradually towards creating meaningful conditions of work, he became increasingly involved with Edward Matchett's practical programs and their backstage development work. Mr. Blake has contributed significantly to the formation of the disciplines and philosophies of logosysthesis and logotechnology.

"A little boy upon the sand
Lost in the joys of wonderland
Naked, bedraggled, caked in mud
Caring not for man—nor God.
Conquering continents with ease
Which he in every pebble sees
Crossing oceans deep and wide
In every rocky pool espied.
Storming castles, scaling towers
Bridging chasms, damming rivers
Mining deep for hidden treasures
Tunneling to lands afar
Hurling rockets to a star.

Never idle for a moment
Never caring for the next
Caring less about convention
(Doing what the world expects)
Changing one form to another
With a true creator's ease
Looks at all each object might be
Makes it anything he please.
Fired with mild enthusiasms
Lost in wonder and delight
Knowing what to do exactly
Doing it with all his might.

Little boy don't lose thy vision
Industry and skill of hand
Remember that you learned quite early
How kingdoms can be made from sand."

LOGOSYNTHESIS: THE HOLISTIC APPROACH TO CREATIVE DESIGN

Introduction

This paper is an expression of the author's practical understanding of 'strategy' in the design process. We emphasize our concern with Logosynthesis as the holistic approach to creative design, and show how the holistic approach demands radically new ways of thinking which annihilate compartmentalization and mechanism. The holistic approach, therefore, entails that our work is one process. This process is of such a character that it must produce results of very high intrinsic worth. The traditional form of the 'case-study' is not suitable for the expression of our work, but throughout the pages we illustrate our ideas by quotes from 'The Writings of Axon' (b. 2009; d. 2073) which constituted the central input in a major program devoted to transforming an entire branch of materials-science in a large organization (for reasons of commercial security, the results cannot be discussed here). The reader will come to understand that even the concept of design itself must change in the holistic approach. The whole emphasis switches to deciding what is meaningful for that particular-but-total situation. Through searching systematically for Meaning-with-a-capital M to match the entire background situation, the concept which emerges is inevitably far-reaching, unexpected, elegant, sound and commercially significant.

Holo-Action

We want to make it quite clear that action here does not mean the mechanical operation of productive skills. Action here means the action of the whole. When the parts-planning, imagining, moving, judging, feeling, searching, building, and so on-become isolated, there is a sterility, a kind of pseudo action. The plans look beautiful, the strategies are elegant, the work is efficient; but the whole thing is just not a whole but an aggregate

of activities conducted in quite different worlds. The action we are concerned with can perhaps be labelled holo-action to emphasize the difference. A right understanding of holo-action is essential to the conduct of any creative process involving complexities. Given this understanding, design in the meaning of 'mental plan' is no longer appropriate at all, at least within current conceptions of what a mental plan is.

Becoming Sensitive to Holo-Action

There is currently a raw encounter with complexity which should give us grounds for hope. The old systems, policies, theories, institutions, etc., just do not work. The environment is teaching us that reality is complex, subtle, deep, and fundamentally uncertain and hazardous. Even in the smallest problem of design, for example of fuel-injection systems, where advanced solutions would be immediately highly profitable, engineers are reduced to rule of thumb exploration and the build up of a fragmentary 'lore' of good design. Attempts to computerize do not work because the process is not reducible to binary relationships. Traditional methods, and most so-called modern methods cannot ensure mastery of real complexity since they lack most of the holistic character of that which is real.

Axon's working area has now been examined microscopically. The examination has revealed ingenious hiding places constructed by Axon in blatant defiance of the Security-S perpetual scanning procedure which made such individual privacy an 'impossibilty'. (His ingenuity begins to make Mose's feat pale to insignificance!) The layout of the hidden documents bears the same title as Axon's red and blue abstract painting. The reason why is not obvious. Indeed, nothing is obvious. The document is composed in seventeen languages,

almost all of which have long since dropped
out of common usage across the planet Earth.
Almost every other word switches to its most
distant communicative form and requires a
Knowledge of the culture behind the concept.
Five hundred of the world's major scholars
are currently attempting the task of decipher-
ing, which you will appreciate is not easy.
(A decipher session gives a new insight into
'speaking with tongues' and the supposedly
mythical Tower of Babel).

Holo-action demands that we think not so much in spatial, but in temporal terms. And the time involved is not the linear time which the algebraic consciousness of our culture has invented to control the work of the lower echelons of society, it is living time, or the time which is that of continuous creation. 'In' this time, spatial thinking is secondary, a fall-out from the action. This is, of course, quite the opposite to most contemporary thinking on design in which spatial thinking is made the primary element and the dynamic of time is supposed to follow. To get at what we mean, look at any systems diagram or model of the design process as it is described in the textbooks. These diagrams are static spatial arrangements, saved only by the insertion of feed-back loops. The feed-back loop is in fact the only dynamic element there is in such representations and it is deeply mysterious in showing a combination of a material process and a communication influence.

In our work, we found this concept of dynamic feed-back the best current expression for the action of self-monitoring during design in which the awareness of the individual is tuned to influence the processes going on in himself, in real time. This concept of self-monitoring was the first excursion we made into the domain of living time, and it

is slowly being adopted in other circles concerned with experiential learning[1], where up to now, there has been lacking any notion of a control process appropriate to self-directed action. Self-monitoring deals, of course, only with the personal vantage point. The non-personal reality comes into presence of the person through specific kinds of communication, which we will discuss later.

From the vantage point of living time, novelty is taken as primary. This does not mean that our eyes are closed to the evidence of repetition and mechanicality which abound everywhere in human life. Most activity is and has to be stable or cyclic. Only at certain points will there be emergence. And all the evidence suggests that points of creation are nothing but trouble to those involved and come out of conflict and struggle within individuals and groups. It is a commonplace to speak of a painting as showing evidence of the resolution of a tension experienced in the artist. Such tensions or difficulties are the way in which the stable mechanical processes of our lives are fractured and action goes into living non-repetitive time. As we shall see, the kind of tensions involved is a very crucial issue and there is very important work to be done in shaping the tensions for meaningful achievement. Such shaping belongs to what is truly essential in strategy in the old sense of deployment of one's forces to turn the situation to advantage. One important difference from this 'military' meaning is that we are in a work of co-operation, not of destruction. Even here, however, we will admit to a certain kind of warfare, namely that between the old and the new, especially in oneself. If our future is not going to be a repetition of our past, if we are to really enter living time, then we must conquer the past. Like a good conqueror, we will not destroy what we can use!

The Content of Living Time

The important question is, what are the forces at our disposal? The simple answer is: everything that we are and can be. And here, then, is

1 John Heron et al "Experimental Techniques in Higher Education".

another vital insight:holo-action is action of the whole man, not just of his problem or of his 'educated' and conditioned brain. The whole man is in communication with the entire universe in zero-interval moments, but little of the content of the universe is normally transduced. Holo-action is not a private subjective exercise but rather an active cooperation in the work by which evolution comes about.
Our work is part of the one process. We do not conduct a development program, but are involved totally with the team of scientists and designers.The old concept of the meta-system is not adequate for the holo-action we participate in, to which we have given the name Logosynthesis. Logosynthesis, which means the creation of meaning, is the continuous creation of a cloak without a seam. We do not tell other people how to design, or what the principles are, and then get them to do it! We work on the creation of meaning with them, teaching primarily through demonstration of personal commitment and attitude, encouraging each man and woman in the team to participate in actions which give opportunities for zero-interval communication with the universe by which we crystallize new understanding and further visible creations.

You've all been swimming the wrong way, or
been carried away from Omega towards
Alpha automatically. If it wasn't sad it would
be laughable.

No observer, no manipulator. I in thee and
thee in me, we shall be what we shall be!

Pearls of great price must be hidden from swine
or they would make the whole universe
their pig sty.

True perfume does explain a great deal.

A growing creative universe when intelligence in charge-in state of creative flux with increase in all directions; realization of this state = complete metamorphosis in our outlook in life.

Inconceivable to little minded pigs.

Universe, whole or part, changes and grows and develops just like a child.

World at bottom not substance but flexible changing patterns pulsating with life.

The content of living-time which the design team learns to comprehend is not the mental content of 'traditional' or 'systems' designers. It is more akin to music and conversations broadcast by many different channels of a modern radio with one essential difference, namely that much of the material concerns the nature of what is needed as distinct from what exists already. The mass of discoveries, past achievements, ideas and so on which we have accumulated are not simply perpetrated but kept in the background. In the foreground is what the future is calling forth.

Where Logosynthesis is practiced in a group, each person must find or create his or her own place in the holo-action, which requires being sensitive to one another as well as to the world at large. Hence the burning questions of authority, leadership, responsibility and so on which occupy many minds today are crucial here also; but for us they are inseparable from the content of the task, and cannot be resolved apart from the achievement of meaning which we are continuously striving for. This emphasis is important, for all too often, the design process is conceived of as taking place in a fairyland of detached men-

tation apart from the real characters of the people involved, the specifics of the task in hand, and the socio-historical forces at work in the group. Holo-action is the whole and any strategy which ignores the most immediate human group within the whole is willfully stupid.

Fragments derive meaning from whole. All
belong to wholes. Belonging is a vital concept.
Relativity only halfway house to more
fundamental notion.

Build from source of all visions, dreams, ideals,
values, meanings which now mold only in-
directly. The direct way much easier and a
million times more effective.

Meaning-the Stochos Point

In living time, there is direction. But this is not a direction towards a thing, or even an objective in the ordinary sense. It is a direction along which complexity, conflict, and uncertainty can be progressively resolved, towards a condition of complete perfection. Since we are speaking of living time, we must not suppose that the end point is 'out-there', way ahead, separate from where we are. The end point, or Stochos - to use the Greek word which has given us the term stochastic- is present in the beginning of every holo-action.

In our work, the stochos point is understood as maximum meaning. Thus, it is treated in a relativistic fashion and can be grasped in any situation from making a pot to transforming society. Every person should endeavor to articulate what is the stochos point that is effective in their work. If the stochos point is 'efficiency', 'profit', 'self esteem', 'the social good', or whatever, this will determine the universe of action accordingly. All such stochi are valid, but limited. The

concept of meaning is open enough to enable us to constantly question the criteria in effective operation while giving a powerful focus to action. The stochos of total meaning is progressively made the essential value in the continuous self-monitoring.

Meaning can be seen as the positive value par excellence. It has no opposite except its absence. It is the new in the old and the old in the new. It is the fulfillment of the individual in the performance of work for society. It is the commercially profitable which also advances the quality of life of everyone involved. It is the unification of complexity without the loss of diversity. It is uniqueness in conformity. And so on.

Confidence in the Presence of Mystery

A major part of the difficulty in grasping this way of working is due to the inculcated drive to understand before one acts. This is a major barrier to logosynthesis , as it would be to producing any great work of art or true craftsmanship which always comprehends without knowing in the more limited intellectual sense.

It costs the individual something to break through this barrier of intellectual pride so that he can truly know. He has to sacrifice what he considers to be most precious, namely, his cleverness to work as naked as the child on the seashore. A point of meaning can be utterly mysterious- such as belief in the workings of a God- but can be confidently recognized and felt and worked with in the true process of creation when the whole being is in its most sensitive and receptive state. Indeed, contact with the realm of the mysterious is almost essential to any major achievement. The form of the mysterious is immaterial-it can be found in the beauty of an internal combustion engine as much as in theistic emotions.

In the holo-action of which we speak, the mysterious is contacted and put to work, or rather it is knowingly worked with. At the same time, and this is most important, all that can be known, understood and felt

of the existing situation is struggled with until the real conflicts, uncertainties and inadequacies of what exists are fully experienced (relative to personal capacities). Part of this struggle involves grasping in concrete detail the sway of mechanicality in the particular people, systems, organizations and situation involved. The term mechanicality refers to all that has ossified and is now outside of living time. It includes 'emotional blocks', 'intellectual conditioning', 'compartmentalized belief systems', 'features of arrogance', insensitivity and so on. All such things have their counterparts in the actions and creations of people as they are normally evidenced.

The Struggle Against Mechanicality

Both the struggle against mechanicality and putting the mysterious to work have something 'impossible' about them; but they turn out to be the truly needed components. The 'art of the impossible' is simply the role of true intelligence. We can see how much damage has been caused by contemporary education and institutionalization in which so much energy has been devoted to the elaboration of the possible, and the future treated at best as a naive extrapolation of current patterns. This allocation of energy has served to erect barriers to holo-action. It has cut off access to the communication world of living time in which the world 'out-there' is as intelligent as the world 'in-here'. The escape from the world of mechanicalities and the restoration of access to this world of communication is one of the main tasks of Logosynthesis and constitutes the greater part of our activity in producing meaning with individuals and groups.

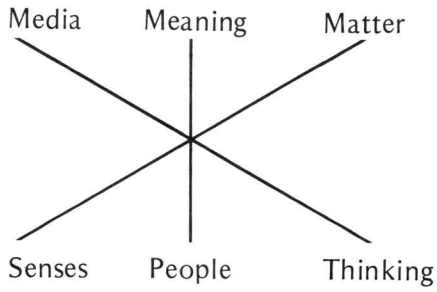
...early recognition of a host of heterointelligence foci which even in Axon's childhood were regarded as 'qualitatively' different from human intelligence just as 'inorganic' matter was differentiated from 'living' matter. Thus his desk diary for 2073 contains such triunics as 'The insect looking at the flower

taught me about light', 'Benzene is stability and reactivity'. By his Tech N phase Axon was in very active communication with the whole universe of 'lower' forms of creation – with biogenesized forms, with molecular systems both polymeric and monomeric with atomic and ionic aggregates, with plasmas and sub-atomic forms, down to quantal particles at the threshold of existing recognition. Thus he had reached a key point of meaning in his journey towards par-elligence - that the microcosm contains its own cosmos, that the 'lower' has been the 'higher', that 'time-past' is alive in 'time-present'. Such sensitivity to universal creation is now increasingly recognized as 'normal' and not as 'abnormal' state; in the former 'age of faith' it was, if suitably expressed in dogmatic forms, acclaimed as a sign of holiness or even sainthood, but in the 'age of science' preceding present times its denial came to be hallowed in the certainty of uncertainty as expressed by Heisenberg's Principle.

Communication

To make our concept more accessible we produce here a figure which suggests certain correspondencies between our triunity of communication and the common notions.

Figure 1



The three terms: media - meaning - matter can easily be given a respectable pedigree in the history of human thought, but that is of little account here and is not something we explain in our programs. Further, they were not derived from historical studies but from a direct perception of what is always needed to accomplish significant creative work. But they refer not only to the human mind, but to everything that can be thought of as involved in the process of evolution, from the elements to the stars. Put in temporal terms, media is the 'wind of the future' while matter is the 'water of the past'. Indeed, there is a meteorology of the creative process.

In the past, we found great difficulty in describing the nature of media and had to rely on much illustration and example to convey the sense we intended. Recently, however, we have come across the notion of 'time vectors' which seems to express it nicely. In living time, the future is active; how else could there be guidelines to creative action! Remember that in the creative process as we see it, what is central is the continuous creation of reality, from which there derives all kinds of ecologies including that of meaning itself. The man participating in continuous creation has to tap into the time-vectors of evolution. These are the signals of the future - not the future which is the fall-out of the past, but the future which is genuinely more than the past, which has to be brought into existence by creative work. It should be obvious that every great man of action, every discoverer, and so on has at some time tapped into this band of the communication plenum.

Take anything. It is not too late.
I cannot tell you about time, but the conclusion
is that now you start, and if you don't it is be-
cause you see no goodness in it. The fault is every-
where. To make, sweating and anxious for a
result is a dog's life. When the guts ache, you

lose your taste for wine. But that's what is needed. The good wine - paid for, sure! - but good wine is in the taste of it, amongst friends, to awaken gratitude towards the life you eat.

To begin, take anything, A passing song, the shadow on the wall, a remembered love, tablets of stone, your half-remembered dreams, the old tomes on your table, the mumblings of your teachers, what you wanted as a child, the feelings touching you when you see a painting that enlivens, the blank sheet, a mathematical construction, the building, the terror of people, the meaning of life, acres of scientific texts, journeys, biographies, poems, films, transductions of any form, the sound of sound, ripples over the hemisphere, echoes of your footsteps, the laughter of children hidden in the shrubbery, the bowl of roses, scent, your life as a whole, all you have done in the laboratory, matrices, charts, walls, logic circuits, whistling in the dark, heaven, holy men, beatles, stick-insects, comedy, your despair and hope, the meaning of your friends for you, the essence of your work, the time of today, glistening, color and colors, the shapes behind your eyes, the thoughts you let go because you didn't like them, the sensations in your toes, the lurching of your scriber, the worth of the air-conditioning, sorrows and how to have them wholesomely, begin, begin, but anywhere, anyhow, but Begin, not just trundle down the alleyway of your materializing emptiness.

It is faster.

All places emanate.
The nexus commands me everywhere. Timing is all.
Pausing moments lift up the light to heaven.
My hand stirs up the hell.
Density grows in all directions in the new space.
The colors of black.
It will end for me. At the end when it is. To begin
again in the hole beside myself only I can see.

Our work in the last year has brought about a keen awareness of the significance of active nothingness in the creative process. We have come to see that the whole is brought into being through holes. This is the complete opposite to current attempts at putting together, or integration. Need itself is essentially a lack or privation, a kind of hole in existence. And it is obvious that the motions, changes and transformations of material existence are possible quite literally because materiality is largely nothingness. In exactly the same way as holes move in a transistor, so holes move in people, enabling them to transduce the time-vectors of evolution into holo-action. Stable processes are closed, unholey! Emergent processes are holey!

The elements of experience that are calling media are omni-present but require the rupturing of linear successive time in order to be heard. That is why we involve people in making major steps forward in very short periods of time: something other than stable processes must come into play.

Avoid what you've done. It's your death mask.
There is no help to be taken or carried from the
past. The past that is living gives to the living not

to the echoes.

One day, fine words you spout! Oh, how you
like 'em! You go on sounding the sounds you
liked yourself in, a standing wave of evacuation
of meaning.

I know the folly. For years I've been clever. Now
I've learned to stop cleverness and operate the un-
measurable source of measures and call it the
Living.

Stuff is limitation and we need to communicate with limitation, which means to grasp the nature of limits and the limit of limits. Every work that surrounds us is a demonstration on this theme, whether it be a mountain, a poem or a fleeting mood. Everything is caught into a web of limitation that is total. But whether this 'system of the world' is complete or even consistent can never be finally known in terms of what exists. In terms of media communication, the message seems to be that it is consistent but not complete.

Near the beginning we spoke of introducing the material of painting and music. We have also used flowering plants, sculptures, fossils, lyrics, tiles, cartoons, fashions, artifacts of all descriptions. The message is simple: know the world and keep in contact with the limiting process by which the world is sustained. It is the limitations of language which make poetry possible and meaningful. The same similarly for all the arts. And in the technological sphere what goes on essentially, to quote Paraoelsus, is the 'operation of nature upon nature'.

Interpretation and integration of Axon's remain-
ing thoughts and traces suggest a code name for a

fundamental equation of far reaching significance.

It is believed that this equation holds the key to the conscious synthesizing of all matter patterning and properties. Also that it operates at the meta level to co-ordinate all known scientific disciplines and established relationships.

The equation - if it exists - must obviously cross the borders that were once thought to divide the inanimate and the animate. It has some connection with the basic media - matter - meaning equation, particularly the point and state of meta-control.

There is much to suggest that Time is a key variable.

Participation in Living Process

The world of immediate perception may appear meaningful. But it is only the surface. Within the stable processes of self-limitation are the holes by which something more meaningful can be brought into being. It is the perception of the detail that counts: the flash of metal in the ore, the quiver of the needle in the magnetic field, the track on the photographic plate led to the iron age, electro-magnetic communication and nuclear power.

There have been accumulated stocks of knowledge about the world, a great deal of which may prove to be very important. But we have lost the capacity to know what is at hand, including the nature of our own mental functioning. By giving the task of finding the facts to experts we have destroyed our essential human capacity to learn directly from observation of and participation in the processes of the world.

What is most important is the transcendence of the spatial criterion of

the detached scientific observer. We seek to develop again, but at a new level and increased intensity, the temporal orientation of the involved artisan who gets his hands dirty and loves what he works with, whether people or stones. All the time he is working, the creative artisan listens to his materials. Eventually, he can tap into the wisdom accumulated in the material; for we can surely talk of such an accumulation in the light of contemporary knowledge which shows that every substance has evolved and carries within it traces of the evolutionary stream. In a sense countless 'problems' of vast complexity far beyond what we have ever confronted in human work have been 'solved' in the process of evolution and now stare us in the face if we but had the eyes to see. Such eyes can be acquired for they too are but part of our evolutionary heritage.

The men and women we deal with who are faced with designing new products and new materials need the matter communication desperately. Functional and specialist separation has routinized thinking into the slave of linear and successive time. Everyone is thinking about something and is out of communication with the real process. These processes are not simply in the materials and apparatus which are produced; they are in the politics and feelings of the people, in the functioning of information transfer and exercise of authority. True to holo-action, we do all that we can to enable our creative groups to be aware of where they are and what they are actually involved in doing. Sometimes this is an unpleasant experience; but it has to be done. Then each person can become an independent center of meaningful work.

It is easy to see that matter communication alone will not lead to meaningful work; what it does is to make direct learning from experience a reality. It is media-communication that releases time-vectors or indications of the unstable and maybe evolutionary moments away from currently stable processes. But the individual or group concerned in the creative

work is partially responsible for the content of what is to emerge. It is not a matter of a blueprint either in the Platonic heaven or in someone's mind. At each step, then, there is the need to adopt the discipline of alignment with the stochos point of meaning.

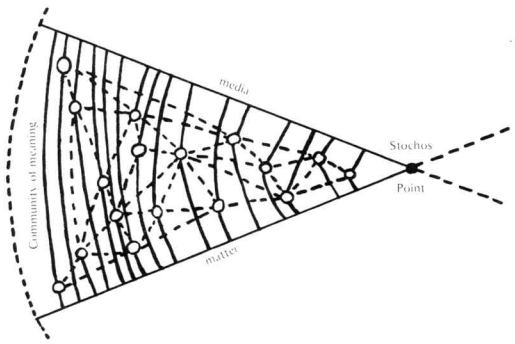
To be really Sure is to become a 'hol-a-part' of
one's whole. Then what one does is right.

Creation of Appropriate Form

The creation of appropriate form is the normally unrecognized overall goal of every true artist, every designer, every manager, every practicing professional irrespective of his or her field. This in turn creates a process or direction that was originally expressed in the formulation - make (matter plus media) meaningful.

Figure 2 shows a progressive line of work culminating in the realization of the stochos point. The left-right direction is that of successive moments in development, approximation to that of linear time. But it would not be true to say that there is a high degree of coincidence. It requires the energizing of a large number of points of meaning to really establish an evolutionary advance. For this reason, we can call the holo-action stochastic, in line with modern statistics, as well as with the new thinking in which space-time is derivative from transfinite structures.

Figure 2



The principle of the stochospoint of meaning is experienced as very concrete. It entails: if what we are doing now is not meaningful, it will never be meaningful, for we are out of communication with meaning. Meaning is not just lying around waiting to be picked up, you do it now.

Finally at last to enter into what has been made in
me, in ways I scarcely comprehend, from sources
invisible, in the simple moments when I obeyed and
listened and transmitted, feeling the current flow
through me, often too much, sometimes too little
to distinguish. Somehow knowing what
had to be done; though it was all too simple
to comprehend in a human way; traveling so
much all to return.

"Inter-stellar spaces- ah yes, but how many
times greater spaces terrestrial are!

First for example, a child ....then a neighbor,
a moment later - oh how incredibly far!"

It can be said of me that I listened - and let
my hearing open itself to the visible and in-
visible equally and patiently - and sometimes
there was love in a kind of speaking within me.

"Secret no more;
merely among the all -
open secrets
a tremulous one"

Now I go into the place of my listening, to become
what I say, endlessly making.

Meaningful Work

In use the concept of meaning will be found to be a unifying concept. It has the inner power to direct the attention into those avenues that are the really important ones, and to direct all attempts to synthesize a range of partially formed ideas. This concept is equally applicable for the handling of all kinds of data.

In fact, it is only meaning which can serve as a holistic principle in the coalescence of diverse information. If a group is working in a community, they need to relate together dubious statistics, personal experiences, measurements, sociological frameworks, the way in which opinions are weighted, political tactics, economic factors, attitudes and so on and so on. The various sectors of information are produced from quite different standpoints, with quite different methods, requiring modes of understanding, appealing to quite different times, by quite different routes and are involved quite differently in the field of action. The actual complexity of the situation goes far beyond a simple dichotomy between quantitative and qualitative data. It involves the changes produced by the investigators themselves, by their purposes, expectations, beliefs, backgrounds and commissions. An abstract hierarchical model of information levels could easily be invented but would thereby falsify the situation, because it would turn it into a problem out-there thought about spatially.

Extensive materials are given on how to recognize a point of meaning, but no effort is made to force people to even look at them. The conviction of the need to search out meaning must grow within the person until he or she feels able to relinquish the lesser goods of control, profit, esteem and the like.

To inquire 'Who should derive the greatest benefit, which person or which group?' reveals that the concept of meaning is misunderstood. For the concept must apply in every direction simultaneously. All persons who are in any way involved must benefit, and all must benefit

to a high degree. Without the concept of meaning to guide all thought and choice this is well nigh impossible. Yet the concept contains the power to point the way.

Take any object. Consider its influence on those who are involved in any stage of its production, marketing and use. Imaginatively improve its influence on one and all, permitting the concept of meaning to have its sway. Take careful note of the changes that the object undergoes. The new product is emerging from the old. Where there is not an old product to start the process begin with an idea. Any idea. From anywhere.

The holistic approach does require a large amount of detail, but concern with the whole does not entail an extensive investigation of everything. Enough work is required to enable people to tap into the living time of their situation; then the process almost works by itself.

The cybernetic concept of adequate variety is most important. In our work, this entails that the information-processing capacities of people are stretched to the utmost. It could almost be said that the particular content of the information does not matter. As long as the quest for meaning has been pursued into enough details, enough depth, enough variety, access to the plenum of communication will have been opened up and the person can create meaningfully. Naturally enough, there are thresholds. These herald quantum jumps in the meaning band and orientation towards a more ultimate stochos. The individual must inwardly judge the appropriateness of any given stochos point as the telos of his action.

Anyway. It's True! It's Anyway!
The new space-time is anyway. As long as you
begin. No Goals! My God, the systems theory

of a hundred years ago. The motivational causation of the industries that sent everyone to sleep and dirt and fantasies of achievement. But Going. Begin-Go-Going is it all. There's nothing else to do. In Anyway you find the goodness of it. For you go anyway and find your way. For you only one way of the anyway, but you don't know it yet. You go anyway and find your way. This is a space For People! Begin-Let Go-Go Away Anyway Begin-Go-Going Beginning To Go Take anything and do it truly. Find what you can do truly. Which will be what you have never done before, or not in this way. You do not do it, but you are needed, a third part of the total composition, in which the going begins. The fig tree bears and is spared. Or go into the ongoing and face it happily, for it is real. Or stop what is going and go elsewhere for there is anyway. The struggle is within you not outside. Only you can solve the meaningless in the equation and render into meaning what you do. The accomplishing that is right will come if you are going, even beginning, even taking anything, anyway for Real!

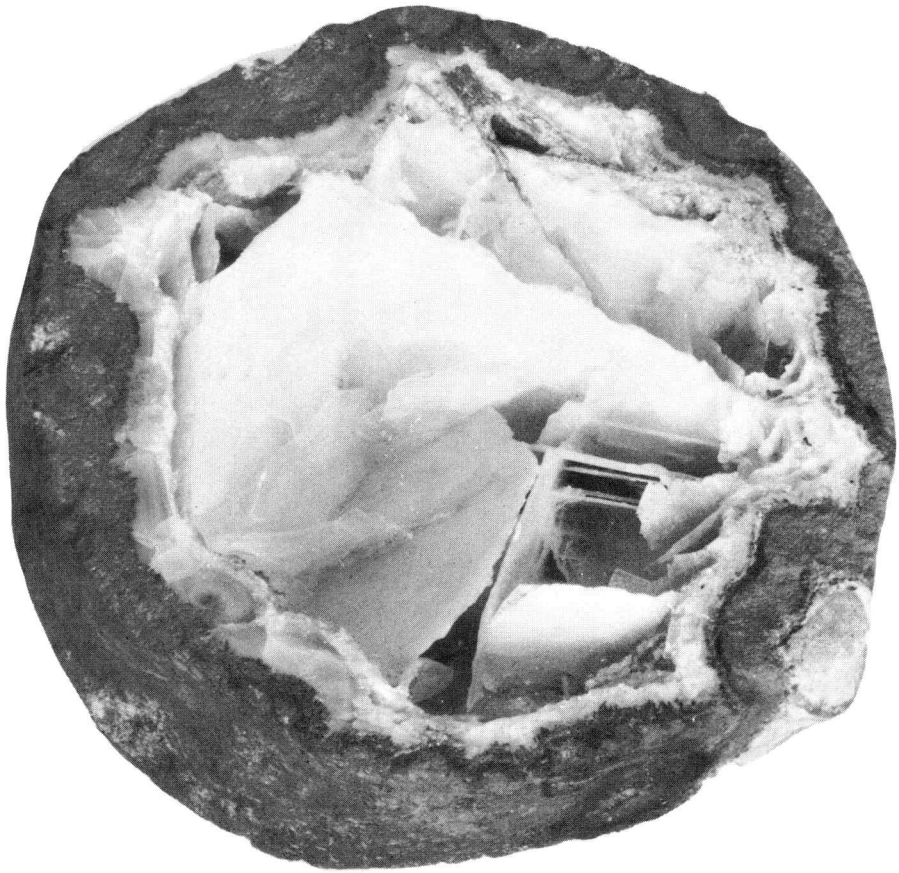
Gestalt Thinking of Logosynthesis

The holo-action of Logosynthesis feeds into itself in living time. This is primary. But inner time becomes represented in outer space. Media twists into form - appropriate form. The time-vectors produce emergent gestalt patterns in thinking, perceiving and communication.

In figures 3 and 4 we show actual geological illustrations of this process. These 'geodes' were formed within cavities - as in Logosynthesis, form is

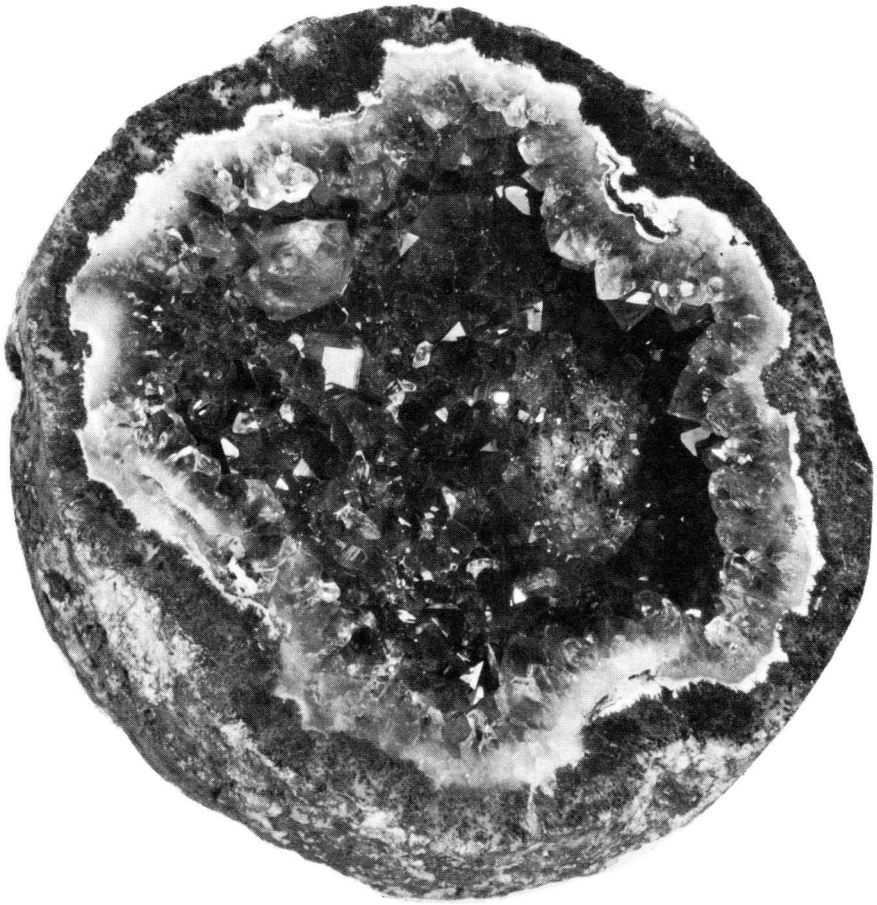
crystallized in the cavities of need. The first deposit is a crude mixture; but as layer after layer is deposited, the outer shell becomes a highly selective filter until the inmost crystal formations are of very exact form. Many different constructions can and do arise. Figure 3 suggests the multiple planes of discrimination that begin to form. While figure 4 portrays the complex harmony of elements, still exactly corresponding to the original cavity-shape, which emerge in the final product or method.

Figure 3



The geode formation is self-regulating, given the character of the original cavity and the degree of solution or vaporization of the constituent material. In this way we can see how a structure of nothingness can induce an emergent process in a suitably fluid substance.

Figure 4



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THE LLOYDS LIFE EXERCISE

John E. Wood

John E. Wood graduated in Ergonomics in 1969 from Loughborough University of Technology and received a Masters Degree in Design from the Royal College of Art in 1971 for his work on the development of Interactive Computer Aided Design Systems for Architects. Since graduating he has been engaged in the application of Ergonomics to the design, development, and evaluation of a wide variety of capital and consumer products. These have included fire-door-closer-systems, chemical closets, toys for handicapped children, as well as both the hardware and software aspects of computer systems. He is a member of the Human Factors Society, Ergonomics Research Society, and the Design Research Society. Mr. Wood is presently a research fellow in the Department of Design Research at the Royal College of Art where he organizes and conducts a one-year course on Ergonomics for the postgraduate students.

THE LLOYDS LIFE EXERCISE

Perhaps, of the more noticeable characteristics exhibited by the practitioners of the legal, actuarial and underwriting professions as a group, is a rather special blend of well-worn conservatism which manifests itself by a certain stateliness and meticulous attention to the niceties of the "appropriate channels". To find such people applying not just one but two completely novel methodologies simultaneously in the conduct of their work is quite remarkable. This paper is about just such an occasion where, for a few days, the design methodologist, the solicitor, the broker, the actuary and the executives of a life assurance company, as a team, worked towards a formula whereby a fledgling company could enter the pensions sector of the life assurance industry.

Objectives of the Exercise

Although Lloyds Life Assurance Ltd. had made satisfactory progress since its formation in April 1972, it was felt, towards the latter part of that year, that the time had come to seek further business by introducing new or improved policies. A suitable area of expansion had already been identified in 'pension schemes' of which the size of the market, as well as the percentage of business written by the market leader, were both known. Lloyds felt that even ½ per cent of the total market would be worthwhile capturing. The costs and time involved in the successful launching of similar schemes by two competitors were known to Lloyds. They had spent in the region of two years on product development. Lloyds had a much tighter timetable in mind with a launch date in January, 1973, just one month's time, with implementation occurring over the following year.

It was this double requirement of generating a series of new pension schemes and completing the work in a very restricted timescale that sug-

gested the simultaneous application of a systematic design method and intensive working to the problem. Pension schemes for three distinct groups of people were to be developed, for brevity hereforth referred to as S1, S2 and S3 policies.

S1 - pension scheme for the self-employed
S2 - pension scheme for the highly paid
S2 - pension scheme for the highly paid and small groups
S3 - large pension scheme with pooled funding of benefits

The Elements of Innovation

As far as both the methodologists and participants were concerned each was venturing into new territory with the former knowing little of the intricacies of underwriting and the latter equally little about the underlying rationale of design methods.

The systematic design method applied to the policies owed its origin in product design and an abstraction of procedures used in the design and development of such items as steel staircases, hospital equipment and the like. It is, however, one of the fundamental premises of the design methodologist that it should be both valid and viable to translate methodologies from one problem-solving field to another. This is because a properly structured methodology relates to the manipulation of information by sets of problem-solving rules and should, therefore, be independent of the actual content of the information itself. The three policies were thus viewed as three products to which a systematic design method could be applied.

In an intensive design exercise, after careful preparation, all those who have the actual power of, and responsibility for, decision making in the conception and implementation of a new product are brought together in one place and kept there without distraction until an agreed concept and plan

for implementation have been formulated. All necessary reference material and apparatus needed by the participants is present and the exercise is carried out under the discipline of a strict procedure and timetable. This technique of intensive working had already been applied with some considerable success to teams engaged on architectural and computer science problems. Experience had shown that the method was most effective when applied during the early, formulative stages of a problem. Here again it was felt that although the final products were different, a building as opposed to pension scheme, the inherent process involved in their creation could be seen as bearing enough similarity that the translation of intensive working from architecture to underwriting would result in the same order of time savings previously observed. From the experience gained in the running and observation of such exercises, some general recommendations on the organization of them had been culled and these were applied directly to the Lloyds exercise.

Organization of the Exercise

A series of four preliminary meetings were held and based on these deliberations, a briefing-paper was drawn up and circulated to participants. Considerable attention was paid in the selection of participants each having to fulfill two basic and complementary requirements. Each had to have an essential professional contribution to make to the design and development process as well as having the power and authority to make real decisions. It was also important to try to make sure that the participants selected would make satisfactory team members. The combined effects of working in a confined space under a time-stress could throw up "personality clashes" which might undermine the rate of progress as well as affecting the quality of the outcome.

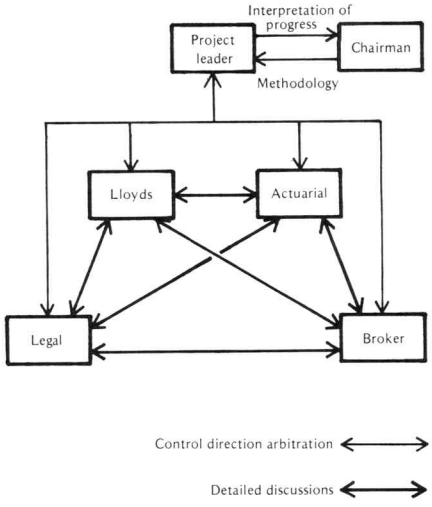
The briefing paper was in two parts: an introductory section outlining the objectives of the exercise, the contributions expected from participants and an event-plan followed by a section specifying in general terms the three products to be designed in respect of their potential market, the manner in which they would operate and how they related to the strategic and tactical

goals of Lloyds Life Assurance Ltd.

The briefing document was used as the basis around which discussions during the briefing meeting took place. This meeting was attended by all participants. Although most of them had met each other intermittently on various occasions previously it was felt important that each person should clearly and unambiguously identify his particular area of responsibility and anticipated contribution to the exercise at the outset. In this way the people involved could begin to feel themselves as part of a team of which they were an essential ingredient.

It was agreed that the Project Leader, drawn from Lloyds Life, would be in overall charge and, where necessary, would act as ultimate arbiter. An integral part of the duties of the chairman was his methodological contribution and guidance through the exercise. This mode operation is diagrammatically illustrated in the figure below:

Figure 1 Organization and Communication during Exercise



The event plan was discussed and there was general acceptance of both its methodological content and the proposed timetabling of the exercise.

Early discussion concerned the optimal strategy for tackling the design of the three products; they could either be tackled in parallel, being simultaneously brought up to the various stages of outline design and detail design, or they could be handled sequentially. Ultimately, it was decided that the optimal strategy lay in starting off with S1 and pushing that through to outline design before S2 and S3 were attempted. The design and development of S1 was thus allocated to the first day of the exercise. During the rest of the meeting various details listed in the briefing paper were discussed.

As well as ensuring that all participants were fully briefed on the objectives of the exercise and the mechanics of its operation and management, it was felt wise to prepare people for some of the types of psychological stress which could arise from this manner of working. One of the most disturbing stresses was a direct result of the very requirement of having participants present all the time. This stipulation arose from the great advantages which occurred from having everyone continuously up-to-date as well as the manifestly obvious and powerful psychological presence of a complete team. It was this same 'team presence' which made members acutely aware of their own contribution or lack of it. With everyone continuously present it was only to be expected that, as the nature of the problems varied and the appropriate skills to be brought to bear upon the problems changed, some people would find that at times they had no relevant contribution to make. Previous experience of similar situations had shown that such individuals could suffer extreme embarrassment at seeing everyone close-by working flat-out. Participants were warned that such situations did, and would arise, and that although they did not feel that they could actually contribute, they did retain the responsibility of maintaining a watching-brief.

Participants were asked to dress casually and to turn up punctually for the start of the exercise which was set earlier than the time at which the rest of the office started. The major motivation behind this was to give a certain "mood" to the exercise within which a team spirit could emerge. Casual clothing, besides being more comfortable, reminded the wearers that they were engaged on something rather special and, as such, became a uniform. In addition, the fact of starting earlier than usual, eating together and using first names throughout helped to add weight to this feeling.

It was pointed out that, as a result of the reduced time-scale, time was a precious commodity and directionless banter would have to be guillotined by the project leader or chairman.

Arrangements were made for refreshments to be brought in at pre-planned intervals of about 2½ hours and that other than these and visits to the toilets there were to be no other interruptions.

Between the first intensive design session and the last one there was a change of room. Room layout is of particular importance in these exercises, both in relation to their smooth running and also in terms of facilitating their recording. It was essential that everyone should be able to see and easily talk to everyone else. Adequate provision of writing surfaces and display surfaces which could be readily seen by all were also essential. The layout of both rooms with the location of the microphones is presented in figure 2. There were minor changes in the layout of the room during the course of the exercise, one between the briefing meeting and the first day of the main meeting, one soon after the start of that day, and one at the beginning of the second day of the main meeting.

Figure 2 **Final Layout of Room for Session on 11 and 12 December, 1972.**

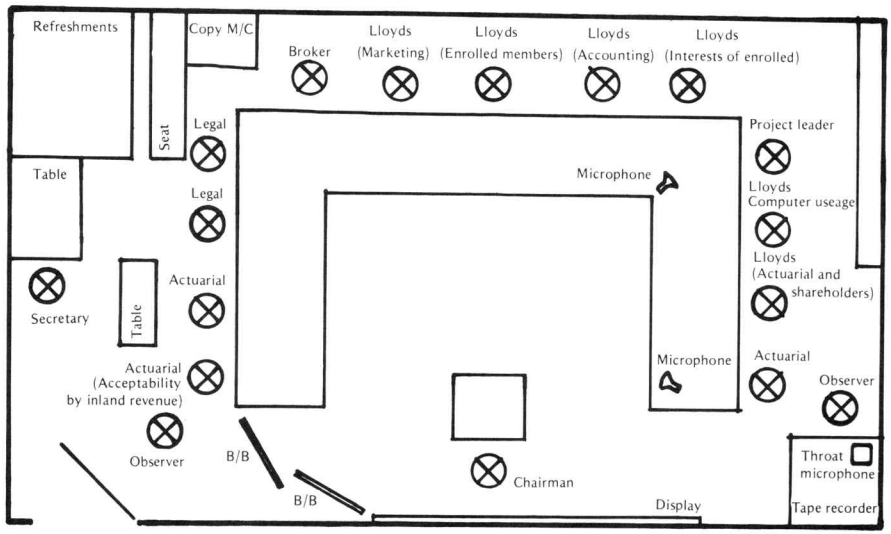
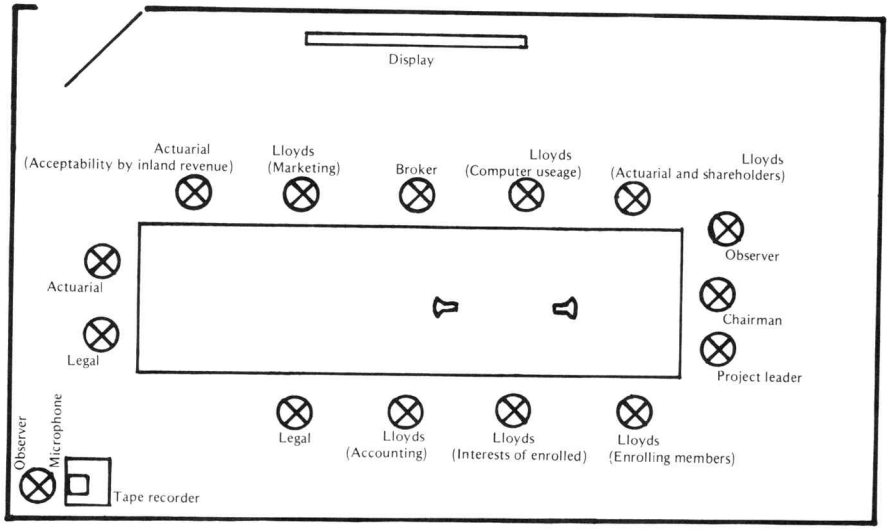


Figure 3 **Layout of Room used for Session on 19 January, 1973.**



The Intensive Design Exercise

The period of intensive working lasted three full days with the first two-day session being separated from the remaining single day by a period of just over a month. During the interim, work was undertaken on detailed legal and actuarial matters of product S1 as well as its implementation machinery. The final session was convened to deal specifically with the detail design of S1. The strategy finally adopted for tackling the design of the three products is illustrated in the chart below in which those stages conducted under intensive design conditions are indicated.

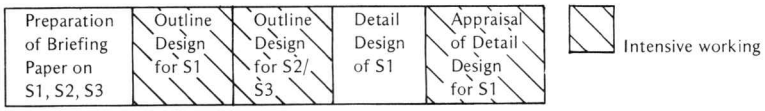
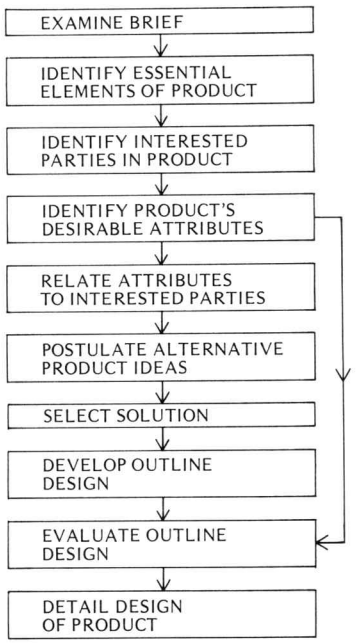


Figure 4 **Design Procedure Adopted**



As an example of how this procedure worked out in practice, the steps leading up to the outline design for product S1 is presented.

A previously prepared list of elements (E), which were considered as the essential structure of a pension producted, was tabled and discussed.

Table 1

E_1 = implementation timetable
E_2 = brokers sales aides
E_3 = specific quotations
E_4 = proposal and acceptance procedure
E_5 = input data about members/beneficiaries
E_6 = alteration of data about members/beneficiaries
E_7 = accounting procedures
E_8 = commission sales and payment
E_9 = periodic inquiries/investigations

Next attention was turned to the identification of those parties who would have an interest in the S1 product as a result of which the following list of people and organizations was generated.

Table 2

I_1 = the insured (self employed)
I_2 = the broker
I_3 = the Inland Revenue (taxation)
I_4 = Lloyds Life selling staff
I_5 = Lloyds Life shareholders
I_6 = Lloyds Life Administrative staff
I_7 = the Inland Revenue (estate duty)
I_8 = the insured (employee)
I_9 = the widow or dependent
I_{10} = the Department of Trade and Industry

With this list of interested parties in mind, the next stage involved eliciting a set of attributes, or characteristics, which the S1 product should possess in varying degrees, Altogether, thirty of these attributes emerged from the team's deliberations.

Table 3 Set of Attributes for S1

A_1 = tax effectiveness

A_2 = value for money

A_3 = flexibility of contribution

A_4 = flexibility of benefits

A_5 = flexibility of investment medium

A_6 = security of investment

A_7 = simplicity for insured

A_8 = service and convenience for insured

A_9 = adequate and prompt reward for broker

A_{10} = ease of administration

A_{11} = simplicity for broker

A_{12} = company and product image

A_{13} = broker service

A_{14} = compliance with acts

A_{15} = compliance with duty requirements

A_{16} = adequate profitability

A_{17} = effect of product on company image

A_{18} = speed of implementation

A_{19} = contribution to growth

A_{20} = extension of interests

A_{21} = speed, accuracy and low cost of record maintenance

A_{22} = speed, accuracy and low cost of information retrieval

A_{23} = adequate adaptability to change

A_{24} = minimum requirements for routine handling

A_{25} = simplicity of procedures

A_{26} = record flexibility

A_{27} = compatibility with existing procedures

A_{28} = freedom from estate duty

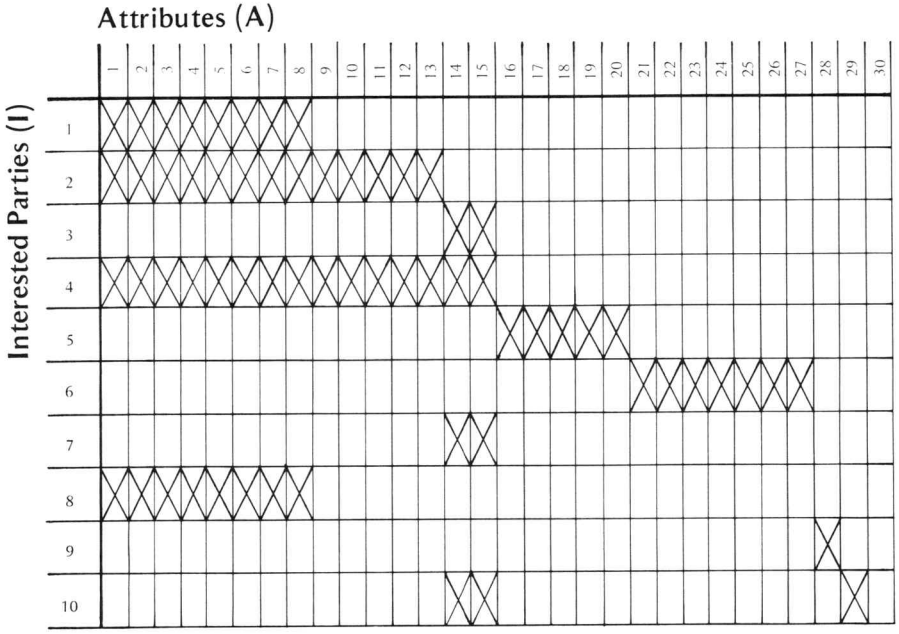
A_{29} = explicit and precise documents and literature

A_{30} = minimum valuation strain

Once having completed this, it was a fairly straightforward matter to determine sets of attributes which were of particular concern or interest to each of the interested parties. The result of this examination of the relationship between interested parties and attributes for S1 is presented in Figure 5:

The meeting decided not to attempt to rank order the list of attributes or to try to identify conflicts except where detailed development demanded it.

Figure 5



At this stage attention was turned to the generation of product ideas for S1. Very swiftly four alternatives emerged and for each a form of words was agreed in which the essential concepts were enshrined. These were recorded and coded as the S1 (i); S1 (j); S1 (k) and S1 (l) product ideas. In further discussion a solution based upon S1 (l) was developed. On evaluation against the attributes the developed solution was felt to exhibit most of these attributes to a satisfactory degree; those which were not fully satisfied were discussed individually and possible courses of action explored by which the requirements imposed by the attributes could be eased or circumvented.

At this stage the outline design for a product for S1 was felt complete and further work, not under intensive design conditions, arranged for the detailed design of the product.

In respect of the S2 and S3 products were concerned, it was decided to start on the S2 product first. It turned out, however, that the emerging S2 product idea could be made to serve S3's requirements equally well. The work conducted on the outline design of the S2 product made use and amended the lists of elements, interested parties and attributes produced during the development of the S1 (I) product.

For subsequent analysis and for the preparation of reports, detailed records were taken of the exercise. The most important record was a handwritten one in which the topics of the major discussions and the conclusions reached were recorded against the time they took place. A note was also kept of all the documents tabled and discussed. Any charts or tables drawn up on the blackboard were recorded. As a back-up record, the whole exercise was recorded on magnetic tape. Each tape was labelled with its starting and finishing times and at various intervals, on the actual record, a time-check was superimposed. This was done by means of a throat microphone attached to one of the observers.

Some Results and Lessons Learned from the Exercise

The outcome of the exercise must be judged from the point of view of whether it 'produced the goods' as well as on the utility of the design methods applied. As far as the design of the products were concerned, at the end of the final session, three products could be tabled, two at outline design stage, the other well into detail design. Most of the participants felt that the original objectives had been met.

The validity of the dual application of a systematic design method and intensive working was in many ways vindicated by the successful outcome in terms of the products generated. At some stages it was noticeable that the notation introduced provided a convenient meta-language by which a "product S2½" could, and was, discussed. Although, at times, the steps involved leading up to the stage of postulating alternative product ideas were felt by some to be trivial, it did result in the very speedy

emergence of alternative solutions.

Due to the limited time available, it was vital to ensure that time was not wasted in exploring unprofitable avenues. On the other hand the possibility of finding a new solution to the problem at hand was ever present in such discussions. The judgment as to the probable outcome and likely benefit of a particular debate was left in the hands of the project leader. In such instances the application of purely methodological and time tabling criteria would have been crude and insensitive. From the methodological point of view these judgments became progressively more difficult as participants drifted deeper into their own specialties and used their own jargon.

No problems occurred with the introduction of the tape-recorder, the reason for its presence being explained at the outset. A potential difficulty might have resulted from participants feeling rather self-conscious in front of a microphone but this did not prove to be the case with the two microphones on the table lying unremarked-upon amidst the sea of papers, reference books and other odds and ends.

Under the conditions of the exercise it was noticeable that a 'team-feeling' began to emerge after the first day, and people began to relax and loosen-up a bit. It is likely that this type of working, whether or not the exercise had been a success, would have resulted in a better understanding amongst the participants of each other's particular roles and more of a feel of the way in which they worked. After the completion of the exercise and the dispersion of the participants to their respective offices it is also likely that this empathy would remain to oil the more usual daily contact.

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A COMPREHENSIVE APPROACH TO USER PARTICIPATION IN THE SPACE PLANNING PROCESS

Don Grant and Arthur Chapman

Don Grant is an architect and planner, currently on the faculty at California Polytechnic State University, San Luis Obispo, California, and a housing commissioner in the same city. He recieved his Bachelor of Architecture Degree at the University of Oklahoma, a Master of Architectural Psychology at Utah, and is currently completing his Ph.D. dissertation at Berkeley, in Design Methods, Social and Behavioral Factors in Design, and Information Systems Design. Mr. Grant's master's thesis

was a study of the mutual influences of social values and built form in the kibbutz, and his Ph.D. dissertation is a model for basing space planning decisions on user values instead of the designer's values.

Mr. Grant served as the editor of the DMG NEWSLETTER during 1970 and 1971, and of the DMG-DRS JOURNAL: DESIGN RESEARCH AND METHODS during 1972 and 1973, during which time he also served in the capacity of and currently serves on the editorial board of COMPUTERS AND URBAN SOCIETY and as a book reviewer for ARCHITECTURAL RESEARCH AND TEACHING. Current interests include a text for self-instruction in design methods that has been on the back burner for several years; increasing the density and sense of community in existing neighborhoods; and decreasing the energy demand of existing houses (a project that pre-dates the current brouhaha and that will probably outlast it as well). A further interest is in the organization of more effective conferences among people interested in design methods and research. Mr. Grant is Conference Organizer for the 1975 DMG Conference in Berkeley, California.

Arthur Chapman received undergraduate degrees in both Mathematics and Architecture at California Polytechnic State University and obtained a Master of Science, Computer Science, degree from Pennsylvania State University. Mr. Chapman has been involved for several years with the application of computer techniques to city and regional planning. The emphasis of his work lies in mathematical and computer applications to urban problems involving computer languages, information retrieval and graph theory. Currently, Mr. Chapman is an Assistant Professor at the School of Architecture and Environmental Design, California Polytechnic State University, where he teaches city planning courses in Quantitative methods, computer applications, and world and regional modelling.

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A COMPREHENSIVE APPROACH TO USER PARTICIPATION IN THE SPACE-PLANNING PROCESS

A computer-aided, over-lay model space-planning technique is combined with Rittel's IBIS (issue-based information system) in an attempt to set up a sequential, adaptive, user-educating land-use planning decision process. The process is aimed at resolving conflicts of interest among multiple clients in problems wherein land must be allocated among several competing uses. The approach aims at eliciting the crucial value judgements in complex land-use problems from the clients or user's themselves instead of from professional proxies such as architects or planners. The role of the professional in a successful application of this approach would be more that of "midwife" or educator-facilitator than that of decision maker. Implementation in real world problems using portable mini-computers is proposed.

This work was undertaken by Mr. Grant with the support of a fellowship from the Graham Foundation for the Fine Arts of Chicago, granted for work at the doctoral level in systematic design methods in architecture at the University of California at Berkely.

Human judgements are unique to situations that can be described by four characteristics: "O", the object being judged; "P", the purpose for

which the judgment is being made; "T", the time at which the judgment is made; and "J", the person making the judgment. If any of these identifiers is changed, the probability is good that the judgment will change also. Judge J_1 making a judgment of a given object "O" for a purpose "P" at time "T_1" might well make quite a different judgment at time "T_2", and so on.

In papers presented at previous Urban Symposia (Ward, Grant and Chapman, 1970; Grant and Thompson, 1971), the author and colleagues have described a numerically-valued, differentially-weighted parameter space allocation technique for space planning, chiefly land-use planning, based on the traditional graphic map overlay technique used by McHarg (1969), Alexander and Manheim (1962) and others. In Ward, Grant and Chapman (1970), the technique was described, along with a PL/1 program for its implementation on the IBM 360/40, and its application to the problem of allocating land among several competing potential uses. In Grant and Thompson (1971), the technique was described in its application to simulating conflicts of interest and generating compromise proposals in the area of conflicts of interest in the location of low-income housing in Oakland, California. In Grant (1972a) the problem of combining proximity-related criteria with "nature-of-the-spot" criteria was discussed; in Grant (1972b) the application of the technique to eliciting the client's value judgments in the placement of a predesigned unit on a given site was described; and in Grant (1972c) the combination of the technique with the IBIS, or issue-based information system (Junz and Rittel, 1972) was proposed as a means of incorporating the value judgments of multiple clients or users into the process of space-planning decision. In this paper, an attempt is made to pull these diverse threads together into a comprehensive approach to the problem of educating clients about the nature of the problems that affect their interests, about the nature of their interests themselves, and of establishing a land-use planning procedure that reserves significant value judgments and conflict resolution to the people whose

interests are affected by the decisions (i.e., the Operations Research definition of clients, those whose interests a system ought to serve) rather than to professional representatives or proxies.

The nature of the technique itself was described in detail in Ward, Grant and Chapman (1970), and will be only briefly reiterated here. In the conceptual framework of the four identifiers of judgments mentioned in the first paragraph, the two papers presented at previous symposia are as follows:

Ward, Grant and Chapman (1970):

> O, T and J are held constant; P varies. The problem treated was the allocation of land to a whole system made up of three subsystems: housing, a park, and a road, all in one area of land ("O"), at one time ("T"), and from one point of view ("J").

Grant and Thompson (1971):

> O, P, and T are held constant, J varies. The problem treated was the simulation of conflicts of interest among several J's in one area of land ("O", the City of Oakland) for one purpose ("P", choosing sites for low-income housing), at one time time ("T"). An alternate interpretation would be one in which "T" also varied, resulting in J_2's knowing what J_1 had decided at time T_1 before making his (J_2's) decision at time T_2.

There are sixteen possible situations resulting from an exhaustive survey of the possibilities for holding some variables constant and varying others. They are:

0 = constant
1 = variable

O	P	T	J	
0	0	0	0	all variables constant.
0	0	0	1	Grant and Thompson, 1971.
0	0	1	0	
0	0	1	1	
0	1	0	0	Ward, Grant, Chapman, 1970
0	1	0	1	
0	1	1	0	
0	1	1	1	
1	0	0	0	The approach described in
1	0	0	1	this paper.
1	0	1	0	
1	0	1	1	
1	1	0	0	
1	1	0	1	
1	1	1	0	
1	1	1	1	All variables vary.

The approach taken here involves taking one of several purposes, P_1, that is being pursued in a given solution space or area of land, O, and deliberating it from the standpoints of several interest groups, J_1, J_2,

$J_3, \ldots J_n$, with each interest group expressing its value judgments in turn for the mutual education of all affected groups about the interests of the others and of themselves. Thus, in the situation $O + P_1$; interest group (or person) J_1 expresses his interests and value judgments at T_1, J_2 at T_2, and so on. Then, once a workable compromise is reached on P_1, P_2 is taken up. The group of J's that deliberates P_2 may not be identical with that that deliberated P_1 - some of the previously participating groups may not feel any interest in what is being discussed (P_2) while they did have an interest in P_1, and some new groups whose interest is in P_2 but not P_1 may enter the deliberations. The process of deliberating decisions for the location of several purposes, P_1, P_2, and so on, would look like this:

0: P_1:	J_1 at T_1	Purpose 1, say the
	J_2 at T_2	location of the housing,
	J_3 at T_3	is deliberated by each
		of three groups in
P_2:	J_1 at T_4	turn, and acceptable
	J_3 at T_5	proposals generated;
	J_4 at T_6	then purpose 2, say the
		location of a school,
P_3:	J_3 at T_7	is deliberated by the
	J_4 at T_8	interested groups, in-
	J_5 at T_9	cluding a new group and
		excluding one of the
		purpose groups. Then
		purpose 3 is similarly
		deliberated.
$P_1 + P_2 + P_3$:		Finally, a compatible
J_1 at T_{10}		combination of P_1 +
J_2 at T_{11}		$P_2 + P_3$ is assembled,

J_3 at T_{12}
J_4 at T_{13}
J_5 at T_{14}

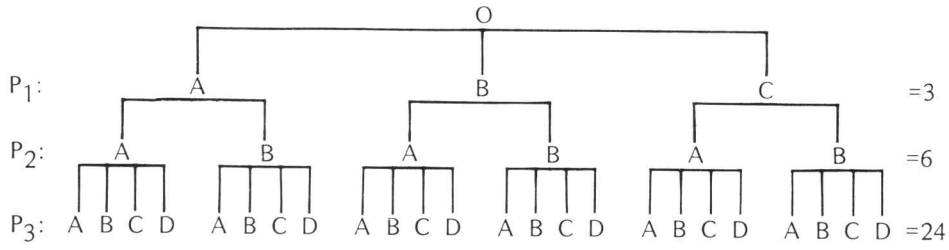
and the mutual impacts among the three purposes deliberated, from the S standpoints of all interested groups.

At each step, several proposals would be generated and evaluated, and recorded for further consideration. Finally, a morphological box would be assembled in which each row (parameter) was the proposals for one of the purposes (like all proposals for housing location), and each item in each row was one specific proposal for that purpose (scheme A for housing location). The purposes and proposals would be listed in order of decreasing priority or value from top to bottom and from left to right, following the deliberation of the priority ordering among purposes (which gets first choice in selecting sites, which second choice, and so on).The specific proposals within each purpose would be listed from left to right in decreasing order of evaluated "goodness" or predicted value. The resulting morphological box would look something like the following diagram.

P_1: Housing location:	Proposal A	Proposal B	Proposal C	
P_2: School location:	Proposal A	Proposal B		
P_3: Park location:	Proposal A	Proposal B	Proposal C	Proposal D

The ordering rule implies that it has been decided by the judges that housing gets first priority on any given piece of land, schools get second priority, and so on; and that Proposal A for housing has been evaluated as being superior (or equal) to Proposal B, and that Proposal B has been judged to be superior or equal to C, and so on through all purposes.

Since there are three proposals in row one, and two in row two, and four in row four, there are 3 x 2 x 4 = 24 possible combinations in this morphological box. They can be expressed in the form of the following tree:



These twenty-four possibilities are all logical possibilities; many of them may not be feasible in practice, for example, if the combination of proposal A for housing and Proposal B for schools placed housing and schools on the same site, and this was not an acceptable morphology in the situation at hand.

Once the morphological box and/or tree for the problem at hand had been constructed, the most highly valued combination of purposes for the three purposes would be sought; the strategy of decreasing order of priority and decreasing order of value from top to bottom and from left to right respectively should lead to the most highly valued group of combinations economically. Several such combinations might be of similar overall value once values of the component proposals had been aggregated using some acceptable aggregation function.

The problem focus now shifts from the individual purposes to the inter-

action or mutual impacts among them: "What is the value of having a school at various distances from housing?" and so on. The specific approach to compromise generation among the several client groups is dealt with in detail in Grant and Thompson (1971), Proceedings of the Sixth Annual Urban Symposium of the ACM, pp. 80-93; and that to the allocation of land among several purposes and of evaluating the mutual impacts among the purposes is given in Ward, Grant and Chapman (1970, Proceedings of the Fifth Annual Urban Symposium of the ACM, pp.122-141).

The computer-aided space allocation technique (C.A.S.A.T.) used in the process proposed here will now be described briefly. It is a development of the value-judgment bearing graphically-shaded map overlay technique described by McHarg in DESIGN WITH NATURE (1969). In the map overlay approach, the solution space (area of land) that is the "O" of the judgmental process is carefully mapped for a variety of parameters. In a typical land-use planning problem, one map might be prepared showing the location of groups of trees of various kinds, one showing existing buildings, one showing watersheds, one showing underground water supplies, and one showing subsoil conditions. Each of these five maps would be a map of factual knowledge about the area of land ("O") under consideration, that is, the "object" of the judgmental process being undertaken. These maps would be a permanent record of factual knowledge about the land, permanent until some change was made or more accurate data was acquired. Once the factual data is recorded on maps, then the planners enter into a process that will no longer be part of the permanent data about the land, but will be a set of value judgments unique to one iteration of judgments; that is, a set of judgments unique to one combination of O, P, T, and J. This set of judgments is recorded on each of the five maps for the five decision parameters described above in the form of shades of black and gray. The maps for the recording of value judgments would be drawn on acetate or some other transparent material in outline

form. The judges would then record their value judgments for a given purpose, time and point of view on the maps for each parameter individually. For the purpose, say, of locating a house, each spot on the map of, say subsoil conditions would be evaluated for its suitability for house location. The spots judged to be the worst possible conditions for locating a house would be shaded black; those judged to be the best would be left transparent; and those judged to be of intermediate value would be shaded some shade of gray. This would be done for the given O, P, T, J on each of the five parameter maps described above (in fact, in any real problem, there would probably be many more than five parameters under consideration). Once the value judgments for the given purpose, P, at a given time, T, by a given judge, J, in the specified solution space of plot of land, O, had been recorded for all the parameters being considered, the shaded maps for all the parameters would then be stacked on a light table. The areas showing through the stacked maps as lightest would be the most desirable areas; the areas showing through darkest would be the least desirable; and areas compositely evaluated as being of intermediate desirability would be intermediately dark. There are some underlying assumptions to this approach that are not universally accepted. One is that judgments on different parameters can be added in the manner described; another is that it is legitimate to implicitly assume, as this procedure requires, that all the parameters are of equal importance or weight; and a third is that a set of judgments of differential quality or fitness can be expressed along a meaningful scale with meaningful intervals between steps, that is, a difference scale with comprehensible steps.

There are also some disadvantages associated with this approach, some of which overlap with the assumptions listed. One disadvantage is the inability to differentially weight the importance of the various parameters. One way in which this might be attempted would be to duplicate one judgment map several times to indicate its relative importance, but this brings up a second disadvantage: the greater the number of maps stacked, the greater

is the tendency for the composite outcome of the stacked maps to become dark gray or black. This is so whether the set of maps is made up of only one map each for a large number of parameters, or includes duplicates for some maps to indicate differential weight of importance. This is basically a problem of discrimination in the outcome, that is, discrimination among the different composite fitness values resulting from stacking the parameter judgment maps. Perhaps the greatest disadvantage of all has to do with the economics of attempting to reiterate one or more times to investigate the implication of different sets of value judgments. To shade a large number of maps as a means of recording value judgments about each spot in the solution space is very time consuming, which is to say very expensive. This limits the number of times it is economically feasible to do so, and lengthens the amount of time required to try a different set of judgments. This then severely limits the usefulness of this approach in any attempts to incorporate a sequential, adaptive simulation process into the decision-making procedure, and limits the usefulness of the approach as a user-educating device.

The technique proposed here attempts to deal with these difficulties by changing the nature of the permanent data record from a map format to that of an overlaid grid of index numbers or letters, each of which represents the factual data that the map records in the same area. For example, if the map for "subsoil conditions" showed a certain sort of rock base at a certain depth by cross-hatching, this would be converted into a descriptor number or letter that stood for the same factual data that the cross-hatching symbolized. The descriptor number or letter would be placed in the cells of the overlaid grid that were more than half occupied by the cross-hatching. In brief, each map of factual data for each parameter would be replaced by a grid of descriptor numbers or letters carrying the same factual data. Then, for a specific iteration unique to one combination of O, P, T, and J, the value judgments would be recorded in a very different way. Instead of looking at each spot on each map and shading that spot

in accord with the judged desirability or fitness of that spot for a given purpose, the judge looks at a list of the descriptor numbers or letters and passes judgment on the whole class of data described, and the computer assigns the resulting value judgment to every grid cell in which that descriptor appears. This is the first step in reducing the time and expense of the graphic shading technique. The value judgments are taken from a scale of standard values. The one used by the author and his colleagues is from one to nine. "Nine" stands for the best situation possible, "one" for the worst possible, and "five" for a neutral situation. The values taken from this scale will be referred to as "Beta-values", and are desirability or suitability or fitness values.

The process thus now has accumulated the following elements:

1. A factual map of the land area for the parameter being considered.
2. A grid drawn on or overlaid on that map and filled with descriptor letters or numbers standing for the same factual data shown graphically on the map.
3. A table of descriptor letters and numbers showing the Beta-values assigned to them for one unique iteration identified by one unique set of O, P, T, J.
4. A new map-grid filled with Beta-values by substituting Beta-values for factual descriptors in accord with the table of step 3, above, each Beta-value being a number from the one-to-five-to-nine scale This map-grid is not a permanent record of factual data; it is a record of value judgments unique to one set of O, P, T, and J. It corresponds to the shaded

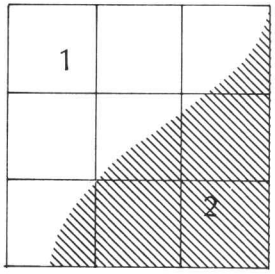
value judgment maps in the map overlay approach.

Now, once these steps have been completed for all the parameters under consideration, it is possible to parallel the map overlap process by simply summing the Beta-values in each cell and recording the sum in a composite outcome map. This corresponds to "adding" the shades of gray on a light table. The cells in the outcome map with the highest values correspond to the lightest areas on the stacked graphic maps. If the sums are divided by the number of maps, the result is an outcome map-grid occupied by numbers from the one-to-five-to-nine desirability value scale. This solves the problem of discriminability, and that of the economics of reiteration, but not that of differential weighting. It solves the problem of discrimination by limiting output to values from a familiar scale. It solves the problem of the economics of reiteration, for the Beta-value assignments of step 3, can be made over and over again with altered judgments, and the computer can perform the remainder of the steps over and over again at low cost and in a very short time. Attention will now be turned to the problem of differential weighting.

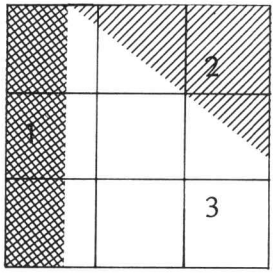
In the graphic map overlay approach, differential weight can be assigned to a given parameter by duplicating its judgment map several times. In this version, the same thing can be achieved by multiplying each number in the Beta-value map-grid by a weighting factor, thus increasing its influence in the sums on the outcome map. This requires a process of ranking and weighting judgment to arrive at meaningful relative weights multipliers, called "Alpha-values". The process described in Chapter 6 of Churchman, Ackoff and Arnoff is a useful approach to this problem (1957, Ch.6, pp.136-154). An Alpha-value must be assigned to each parameter map. It is useful to have the Alpha's sum some arbitrary number, like one or ten or one hundred, in order to force trade-offs during the

deliberation of the Alpha weights. Now, once the Alpha x Beta maps are summed, if the resulting map is divided by the sum of all the Alpha values, the numbers in the outcome map-grid are all numbers from the one-to-five-to-nine value scale, and easily discriminated. Figure 1 illustrates the steps.

Figure 1 Graphic Maps



(1) Zoned Residential
(2) Zoned Commercial



(1) Price Range A
(2) Price Range B
(3) Price Range C

Map-Grids of Descriptors

1	1	1
1	1	2
1	2	2

For:	Beta:
1	9
2	2

1	2	3
1	2	2
1	2	2

For:	Beta:
1	1
2	6
3	8

In deliberation, it is decided that Cost is three times as important as present zoning.

Beta-Value Map Grids

9	9	9
9	9	2
9	2	2

1	6	8
1	6	6
1	6	6

Alpha-Beta Product Map-Grids

Alpha= 1.0

9	9	9
9	9	2
9	2	2

Alpha= 3.0

3	18	24
3	18	18
3	18	18

Clearly the upper right-hand cell is the greatest desirability-valued area on the map given the Alpha- and Beta-value judgments passed. The three left-hand cells are undesirable, and so on.

Summation of Alpha-Beta Products

12	27	33
12	27	20
12	20	20

Divided by the Sum of the Alpha's

3	7	8
3	7	5
3	5	5

Sum Alpha's = 4.0

The Process to this point has divided the space-planning problem into two types of activity: Clerical, manipulative activities involving computations and substitutions, largely done by computer, and judgmental activities performed by the judge "J". "J" might be a planner or designer, or might be the users themselves. If the judgments involved (including the choice of parameters, the Beta-value judgments and the Alpha-value judgments) are to be made by the user directly, the process must not only elicit and incorporate his judgments, it must aid in educating him about the problem, about his interests with regard to the problem, and about the implications of his judgments with regard to the problem. It is for the latter task that the ability to economically reiterate over and over with fast feedback is important. A complete iteration is a sort of simulation of what the situation would be like in view of a certain set of possible judgments. With regard to the use of the technique itself, the key word is "understandable"; perhaps a useful rule would be that the user should learn enough about the technique to be able to work it by hand with understanding before ever attempting to use the computer version.

The next aspect of the problem is that of how to combine the judgments of several people. The approach taken in Grant and Thompson (1971) was to have each person or group of persons with similar interest go through the entire process described above enough times to arrive at an outcome

map-grid that they accepted as an accurate picture of their values or preferences. The outcome maps for each interest group then become the input maps for a new process in which it is attempted to model the relative power or weight in the decision process of each group. The problem of aggregating the values of many people is not a trivial one, and there is much discussion of it.

A survey of thought in this area is available in Minas and Ackoff (1964). The approach taken here is to assign a weight to each group indicating its power in the decision process. There are several ways to approach this. One is to assign weight in proportion to the number of people affected; another is to attempt to model the "right to say" of each group; another is to attempt to model the realities of power distribution in the community. An accurate model of the last possibility is probably the approach most likely to yield a feasible, implementable plan after one iteration, but may not be satisfactory to those who feel that they have a "right to say" that does not correspond to the realities of power distribution or to those who favor the one-man-one-vote democratic model. The question of where justice resides is far beyond the scope of this paper; but it can be observed that if one chooses the first or the second approach instead of the Realpolitik model, and has implementation as an objective, he faces the problem of changing the power distribution, or removing the question at hand from its influence, or of making the outcome of an ethical approach acceptable to the power structure by whatever means. One approach to the latter effort is to model the problem using weights that reflect the realities of power and then vary the weights to determine how sensitive the outcome would be to shifts in the power distribution, or to shifts or trade-offs in the other component value judgments, that is, choice of parameters, Alpha-values, and Beta-values. Sets of value shifts or trade-offs that resulted in a workable plan might then be stated as compromise strategies for proposal to the parties involved.

Whatever approach is taken to the assignment of decision-making weights or power, each group is assigned a multiplier indicating relative power or weight. This mutliplier, called a "Delta-value", is then used as a multiplier on the outcome map of the group's deliberation of the problem from its own point of view. That is, the map-grid for each group corresponding to the last map at the bottom of Figure 1 is multiplied by the group's decision-making weight. These weighted group preference map-grids are then summed for all groups, and the outcome divided by the sum of the Delta-values for all the groups, yielding a map-grid occupied by desirability judgments from the one-to-nine scale. This is a composite picture of the acceptability of various cells (sites) for the purpose in mind. This is the approach described above as holding, O, P, and T constant while varying J, or alternately as holding O and P constant while varying T and J. In view of the comment in the preceding paragraphs about the successfulness of successive iterations trying out different sets of value judgments before deciding on one set, it is perhaps more accurate to describe this process as

$$J_1 \text{ at } T_1 = f(J_1 \text{ at } T_{1a}, J_1 \text{ at } T_{1b}, \ldots J_1 \text{ at } T_{1n})$$

to reflect the fact that J_1 at T_1 is likely to be the outcome of several iterations, rather than to describe it as J_1 at T. This qualification will be assumed in further descriptions.

If the outcome of this weighted-group deliberation is a map-grid with many high values in it, the chances are good that a feasible plan can be implemented even though the various groups might have contradictory views on specific issues. If no workable plan can be generated using weights that reflect the reality of power distribution, then perhaps it is worthwhile to carry out several iterations using an "ethical" or "ought to be" image of group weights to see what shifts in power distribution would be necessary to the implementation of such an image, or what

compromise strategies as described above might suffice to yield a workable program or plan. The problem of arguing and deliberating workable combinations of values for various interests will be returned to after a discussion of the problem of allocating space among competing potential uses.

The problem of combining several competing uses and evaluating the impacts among them growing out of their mutual proximities is dealt with in detail in Ward, Grant, and Chapman (1970). Briefly, the approach is to deliberate each use individually (for example, housing location as the use or purpose "P"), and then deliberate priority weights among the P's. The priority weight is referred to as a "Gamma-value" and is used in deriving an evaluation for each combination of competing uses into a multi-use whole system.

Once each specific purpose "P" (a specific land use requirement, for example, the siting of a housing project or a park) is deliberated, and an evaluated grid-map of the solution space "O" is produced for purpose "P" at time "T" from viewpoint "J", a new type of activity is required. Recall the remark that two kinds of activity have been involved so far: manipulative, computational activities, mostly carried out by a computer; and judgmental tasks carried out by the party whose viewpoint is being modelled, "J". The third type of activity is pattern recognition in the evaluated map-grid of the solution space. For example, if each cell or square in the grid-map represented approximately one acre, and the purpose "P" was the location of a four-acre housing project, then the pattern recognition task would be the determination of which continuous or adjacent groups of four cells had the highest average value. This might be further specified in the form of a requirement that the four-acre site be square, or rectangular with some specified ratio of side lengths, or some other shape. The task of surveying the whole evaluated solution space for the highest valued groups could be carried out by the computer

(in a process of the exhaustive enumeration of possible groups of four, with the values of each group being recorded and used as the basis of a ranking of all possible groups by average cell value) or visually by a man. At present, visual pattern recognition by a human seems to be preferable. That is not to say that once higher-speed computers become available for tasks such as this, that the balance will not shift in the direction of the computer as the performer of the pattern recognition task. The efficiency and thoroughness of the computer must even then be weighed against the educating and involving effects of human participation. The outcome of the pattern recognition task in the evaluated grid-map of the solution space is a list of proposals satisfying the requirements of size and shape. The list might be only highly-valued proposals, or, in the case of exhaustive enumeration of proposals by computer, might be all possible proposals. The next task is to compute the average value of the cells occupied in each proposal, and to rank the proposals in order of decreasing average cell value. These steps are carried out for each subsystem (competing land use) individually. Once a ranked list of evaluated proposals has been assemble for each subsystem (for example, a list for possible housing sites, a list for possible park sites, and a list for possible school sites), then "whole system" proposals are assembled using the morphological box/morphological tree approach described above. The objective of this step is to produce several schemes combining the desired subsystems, for example, one park, one school site and one or more housing sites, each of which is feasible, and each of which is comprised of highly valued subsystem proposals. Once such a scheme is assembled, it can be assigned a "whole system" value based on the average cell values of the constituent subsystems; however, such a value would reflect only the values of the subsystems in themselves, and would not reflect the qualities of mutual interactions and impacts among the subsystems.

A "Gamma-value" reflecting the relative priority of each subsystem was mentioned above. This might be interpreted as a measure of the importance of a given subsystem in a whole system made up of all the subsys-

tems being concerned. A similar measure must now be derived for the interactions or impacts among the subsystems making up the whole system. For a whole system made up of three subsystems, there are six "whole system parameters" dealing with possible impacts of subsystems on each other. For example, using the three subsystems used in the examples above, a park, a school, and a housing site, to make up one whole system consisting of one of each, the possible impacts are:

The influence of:

Housing at location "A":
Housing at location "A":
A park at location "B":
A park at location "B":
A school at location "C":
A school at location "C":

On the quality or desirability of:
A park at location "B"
A school at location "C"
Housing at location "A"
A school at location "C"
Housing at location "A"
A park at location "B"

Thus, there are possible as many as nine Gamma-values and nine separate evaluations for a whole system made up of three subsystems. There might be fewer than nine - some impacts of one subsystem on another may not be of sufficient importance to justify inclusion in the evaluation of the whole system. The Gamma-values for each of these nine or fewer entities (three subsystems, six relations among the three subsystems) are judgments as to the relative importance of each of the entities among the other eight or fewer, and are conveniently deliberated using the Churchman, Ackoff

and Arnoff (1957, Ch. 6) technique previously cited. These Gamma-values are judgments made in response to questions of the form:

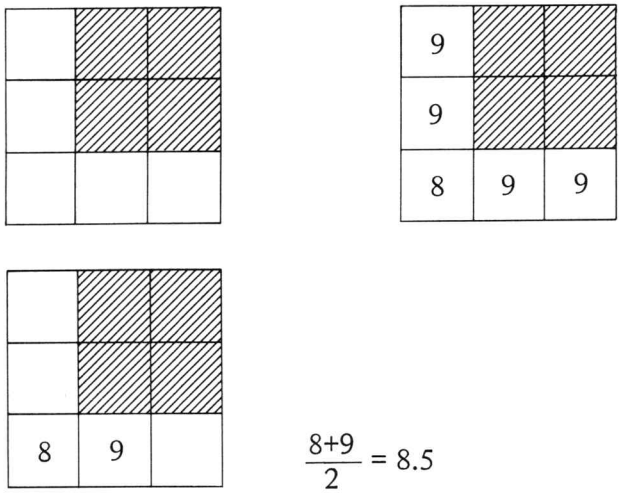
"How important is the impact of housing location
on school location relative to the importance of
the location of the housing itself; the location
of the school in itself; the impact of the location
of the school on the location of the housing; . . ."
and so on.

These Gamma-values can be conveniently noted as follows:

$GAMMA_{housing}$, $GAMMA_{park}$, $GAMMA_{housing\text{-}park}$, etc.

In order to evaluate the quality of one subsystem, the cell values appearing in the cells occupied by one specific proposal, say the location of housing at "A", made up of four specific cells, are totalled and then divided by the number of cells. In order to weight this evaluation by the relative importance of the subsystem, the figure so derived is then multiplied by the subsystem's Gamma-value. The same applies to subsystem interactions or impacts. For a given housing location, a desirability value can be judged for each cell in the solution space for the purpose of park location. For example, cells within two minutes walk from the housing might be judged most desirable and assigned a Beta-value of "nine", while those over ten minutes walk might all be assigned "one's" indicating "most undesirable situation", with intermediate judgments for intermediate distances. Thus for any given whole system made up of two or more subsystems, it is possible to construct interaction or impact grid-maps for each specific proposal for the location of a given subsystem that can be used to derive a measure of predicted quality for the whole system when combined with the evaluations of each of the subsystems in itself.

Figure 2 The construction of an evaluative grid-map for the impact of park location on housing sited at "A".



In Figure 2, a specific housing site proposed at site "A" is placed on the grid-map in the appropriate cells. Then Beta-value or desirability judgments are passed with regard to the "goodness" or suitability of desirability of each cell in the solution space for the location of a park; that is, for the desirability of locating a park in each cell with regard to the impact it will have on housing located at "A". A park at "B" has the value 9 and 8 in the two cells comprising location "B"; therefore, the value of the impact of the park on the housing is 8.5, or 8.0 + 9.0 divided by 2, or the sum of the values in the cells occupied divided by the number of cells.

Refer now to Figure 1. If the housing site "A" were to be placed on the evaluated grid-map of the solution space at the bottom of Figure 1, the value of housing at site "A" would be:

$$\frac{7 + 8 + 7 + 5}{4} = \frac{27}{4} = 6.75$$

This value of 6.75 is on the one-to-five-to-nine desirability scale described previously, and it is made up of three judgments:

1. The judgment as to which parameters to include.
2. The Beta-value judgments within each parameter.
3. The Alpha-value judgments as to the relative importances of the parameters included.

To incorporate this value for housing itself at site "A", a fourth value judgment is required:

4. The Gamma-value judgment as to the relative importance of housing among the three subsystems and the six possible impacts among the three subsystems.

If the process of deliberating the housing purpose in the solution had involved more than one interest group or party ("J"), then there would have been a fifth value judgment incorporated: the Delta-value judgment of the decision-making power (or, alternately, "right to say") of each "J".

These five types of value judgments are key elements in structuring this approach to the space-planning process in a form in which the users or

clients rather than their professional consultants make the significant value judgments. The nature of this approach to user participation in the space-planning process is to break the space-planning process down into components that finally lead to these types of judgments, elicit the judgments from the users themselves in a user education repetitive iteration process that goes on until the users are satisfied that they have reached a point at which they have confidence in their judgments, and then recombine the many partial judgments into overall decisions using an aggregation function.

The overall evaluation of a whole system proposal is arrived at as follows:

Entity: Site Proposed:	Average Cell Value:	Gamma Value:	Product:	Sum of Products:
Housing "A"	6.75[1]	4.0	27.00	
Park "B"	8.00[2]	1.0	8.00	
School "C"	7.90[2]	2.0	15.80	
Housing-Park	----	0.0	.00	
Housing-School	----	0.0	.00	
Park-Housing	8.50[3]	1.0	8.50	
Park-School	6.25[2]	1.0	6.25	
School-Housing	7.10[2]	1.0	7.10	
School-Park	----	0.0	.00	72.65

1 See figures one and two for the derivation of this value.

2 Assumed value.

3 See figure two for the derivation of this value.

The sum of the products, shown above as 72.65, is the preliminary measure of predicated quality for this particular whole system proposal, made up of housing at "A", a park at "B", and a school at "C". The final measure is arrived at by dividing this figure by the sum of the Gamma's, or 10.0, yielding 7.265. This figure is from the one-to-five-to-nine scale along which nine represents "most desirable" and five indicates "neutral desirability".

Similar single-valued measures of performance or quality would be derived for each of several feasible whole system proposals, and the best of the several would presumably be that one with the highest measure of predicted quality, given confidence in the value judgments passed.

A user-participation space-planning process for three subsystems or purposes, P_1, P_2, and P_3, looked at from the viewpoints of several interest groups, might be diagrammed as follows:

Given: "0", the land area or solution space in which the purposes are being located, like a city, or county, or neighborhood. "T_1": the starting time.

Time:	Purpose:	Participants:	Activity:
T_1		The planner, decision maker, and obvious clients.	Deliberate what subsystems should be planned, resulting in the decision to plan subsystems P_1, P_2, and P_3.
T_2	P_1	Same	Deliberate the matter of who

			should participate in the decision on this subsystem, and how they can be brought into the process. Decide on parties J_1, J_2, and J_3.
T_3	P_1	J_1	Deliberate P_1 among J_1.* (Parameter choices, Beta's, Alpha's)
T_4	P_1	J_2	Deliberate P_1 among among J_2.* (Parameter choices, Beta's, Alpha's)
T_5	P_1	J_3	Deliberate P_1 among J_3.* (Parameter choices Beta's, Alpha's)
T_6	P_1	J_1, J_2, J_3	Deliberate Delta-values.
T_7	P_1	J_1, J_2, J_3	Subsystem proposal generation.
T_8 through T_{13}		Repeat steps T_2 through T_7 for P_2, with a new and possibly but not necessarily different group of J's.	
T_{14} through T_{19}		Repeat for P_3.	
T_{20}	P_1, P_2, P_3	$J_1, J_2, \ldots J_n$	Deliberate Gamma-values.
T_{21}	P_1, P_2, P_3	$J_1, J_2, \ldots J_n$	Assemble whole system proposals, deliberate inter-subsystem impacts, evaluate whole system proposals.

*See earlier remarks about times T_{3a}, T_{3b},. . . for successive reiteration by the same "J" as part of the process of educating himself with regard to the problem and his interests.

Thus the whole task has been broken down into a series of three types of activities: manipulation, judgment, and pattern recognition. Once the judgmental tasks have been performed by the various groups involved working as a decision-making group, the individual judgments are recombined into overall measures of performance for each whole system proposal. An additional judgment to be made in the process is as to the form of aggregation function to be used in the re-assembly. The problem of aggregation functions is beyond the scope of this paper, but will be taken up by the author in a forthcoming paper. The assumed aggregation function in the process described here is a simple weight-multiplied additive model, in which the score or evaluation is multiplied by the judged weight of importance and the resulting product summed with similar products for other aspects or parameters. Alternate forms are appropriate for some problem types, including those in which the exercise of a "veto" is essential.

A further problem grows from the question, "Who should participate?" Obviously, the initial decision-making group will be made up of the ultimate decision maker (usually he who pays), a planner of his choosing or an advocate-planner who has managed to gain entry into the decision-making process, and perhaps some obvious clients. The decision as to who is allowed to participate is in the hands of the ultimate decision maker, who in some cases may not be a client in the sense of being a user at all. The broadening of the base of who participates requires either gaining the acquiesence of or the replacement of the ultimate decision maker. In the case of community facilities, there is always recourse to the electoral process to alter the composition of the ultimate decision-making body. The question,"Who should participate?" is in fact secondary to that of "Who should decide who participates?" One approach is to generate criteria for participation or representation and for the weight in the decision process that is to be held by each participant that are acceptable to the party with the initial decision-making power. Another is to publicly pro-

pose the composition of the participants convincingly enough that the initial decision maker feels forced to acquiesce. Another is to displace the initial decision maker by some means or other. Another is to remove the decisions from the sphere in which the initial decision maker holds power, for example by invoking jurisdictions beyond his power. In cases wherein the initial decision maker is a public body, presumably motivated by the best interests of the community and a desire for justice, the first approach may be adequate. In cases wherein the initial decision maker is a private profit-motivated party, one of the other approaches is more likely to be appropriate.The manner in which an ethical image is brought to bear in the real world over the obstacles provided by a realpolitik that is not in harmony with it is beyond the scope of this paper. It seems to the author that decisions in the sphere of space planning on the community scale should be made on the basis of a "weighted" democracy in which decision-making power on a specific issue is distributed in accord with some image of "right to say", rather than on a one-man-one-vote basis of existing power distribution at the time the issue is raised. History does not offer many examples of the establishment of democratic decision procedures democratically, and the short history of attempts at user participation in design offers examples wherein the existing power structure is successful in preventing any broadening of the base of decision-making power (Rittel, "Democratic Decision Making", Architectural Design magazine, April, 1972, pp. 233-234). The approach to this problem proposed here is to attempt to model an "ought to be" image of power distribution. Then the technique described is used to test the sensitivity of the evaluations appearing in the evaluated solution space for a given purpose to altering the power or weight distribution from the existing toward the ought to be. If the sensitivity to alterations in the power distribution is small, it is not worthwhile working on changes in the weighting or power distribution. If the sensitivity is large,then it is worthwhile seeking compromise proposals or a real world alteration in the decision-making weight or power distribution. The strategy appropriate to bringing about shifts in decision-making

weight or power in a community is probably not transferable from one situation to another, and will probably have to be developed ad hoc in each problem setting.

A key problem in many space-planning problems on the community level is the simulation or representation of the interests of groups that have not yet been identified as specific persons, or who may not have yet come into existence. This is a basic problem in such areas as the planning and design of public housing (see Grant and Thompson, 1970, p. 81). There are many approaches to this problem that merit further investigation in the future, including gaming simulation, other role-playing approaches, scenario writing, and the use of existing clients in other existing situations, for example, using a group of residents in an existing housing project as decision-making participants in the planning and design of a new one.

The structure for discussion proposed here is the I.B.I.S., or issue-based information system (see Kunz and Rittel, 1972; Protzen, 1972; Grant, 1972, and Dehlinger and Protzen, 1972). Rittel defines information as a change of knowledge, and the IBIS as a structure for argumentation in which changes of knowledge might be produced. The basic elements of the IBIS is the issue, a question stated in the form, "Should there be...?" An issue that elicts one answer that is agreed upon by the participants ceases to be an issue and becomes a question of fact. For each issue, there are several possible positions (Yes; No; Inadequate or irrelevant question; Yes, but...; No, but...;) and many possible arguments supporting each position. There are topics that group issues and questions of fact, and there are references and citations in support of arguments. Thus the elements of IBIS are:

1. Issues: "Should there be...?", with two or more positions taken by participants.
2. Questions: issues for which only one position or answer is offered.

3. Topics: larger subject definitions that group issues and questions around specific problems or problem areas. A specific issue or question might belong to several topics.
4. Positions: Offered in response to issues.
5. Arguments: offered in support of positions taken on issues.
6. Citations: references offered in support of arguments.

An example of an issue is:

I-1: "Should there be a subsidized housing program for low-income families in this town?":

I-1/P-1: Yes. (Position 1 on issue I-1):

I-1/P-1/A-1: (Argument 1 in support of I-1/P-1): Such a program subsidized by HUD will bring in money that will benefit the local construction industry and provide salaries for construction workers. See literature citation L-206.

I-1/P-1/A-2: Such a program will provide decent housing for families that cannot now obtain it, and this will benefit the community.

I-1/P-1/A-3: The construction of new housing will make it possible to locate low-income housing in better neighborhoods and better school districts instead of concentrating them in lower-class neighborhoods with typically poor quality schools and social services. See L-318.

I-1/P-1/A-4: Building decent housing in projects in carefully controlled areas will allow the community to put potentially dangerous people together away from good neighborhoods and where an eye can be kept on them.

I-1/P-2: No.

I-1/P-2/A-1: If these people had worked like I did they could have good housing without our help. To give them good housing even though they didn't work and save for it rewards laziness.

Obviously, for a given position, arguments may be offered that stem from quite opposite worldviews (see I-1/P-1/A-3 and A-4 above).

An example of a related issue that might quickly be converted to a question of fact is:

I-2 : I-2: Is there a source of federal subsidy for such projects?

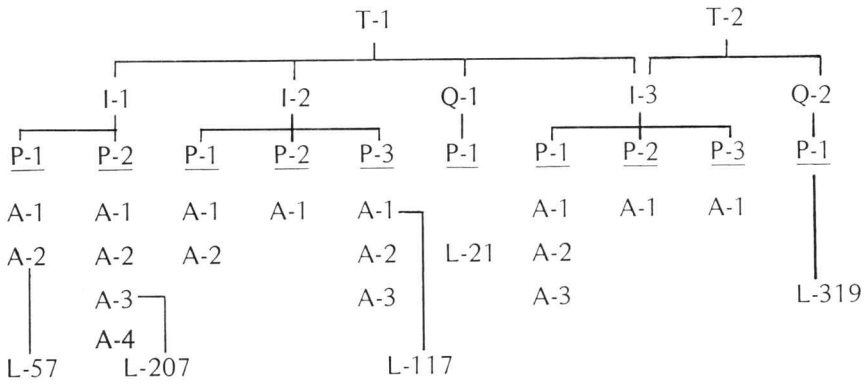
I-2/P-1: Yes. The specific program numbers are. . .

Which might have originally been posed in the form, "Should outside subsidy be sought?", and subsequently reformulated into I-2 (which would be renumbered to "Q-2") plus perhaps:

I-3: "Should we seek funding from HUD for a program? "

All of these issues and questions might be grouped under several overall topics, like "Housing", "Community Development", and "Welfare".

For a given topic, T-1, an IBIS might develop as follows:



There might be relations among the issues themselves of the form, 'Successor issues", "Predecessor issues", "Related issues", and so on. The various references and relations that develop in the course of argumentation in the IBIS format can be recorded in accessible and retraceable form in matrices and trees. The progress of argumentation might typically be traced on printed forms with spaces for the following sorts of data:

1. Issue number and date.
2. Statement of the issue in the form, "Should there be. . .?"
3. Explanation or context if necessary.
4. Positions taken, and by whom.
5. Arguments offered, and by whom.
6. References and citations.

7. Who raised the issue?
8. With regard to which project?
9. Topics to which the issue relates.
10. Successor issues and questions; predecessor issues and questions; related issues or questions.
11. Alternate issues offered in lieu of this one.
12. Purpose of arguing this issue? (To reach a decision? For what action?)
13. Most recent date of argumentation.
14. Current status: decided? shelved? rejected and replaced by an alternative issue?
15. Record of entry into appropriate matrices and trees.

Several forms for IBIS have been developed by people engaged in preliminary work. A sample of one is on the following page.

The specific role of the IBIS proposed for this approach to user-participation in the space-planning process is as the structure for argumentation and decision in the process of making the value judgments required of the overlay model space-planning technique described above.

Issues debated in the course of defining and proceeding through a given problem might include such things as:

"Should we work on Problem A?"
"Should group B be invited to participate in the argumentation?"
"Should we address the problem of a satisfactory combination of purposes X, Y, and Z?"
"Should we agree on the following Alpha- and Beta-values for the decision identified by O_1, P_1, T_1, J_1?"

Statement of the issue in the form: "Should there be_____?"	Issue Number:	Page: ACM7-20
	Date raised:	
Explanation or context if necessary:	Who Raised It?	
	Project to which related:	
Positions taken on the issue: (State position and by whom taken) Designation: (I310-P3) designates position 3 on issue 310) By whom?	Topics to which related:	
	Successor issues and questions of fact:	
	Predecessor issues and questions of fact:	
Arguments for/against each position: By whom? References: Designation: (I310-P3-A1 designates issue 310, postion 3, argument 1)	Related issues and questions of fact:	
	Alternate issues:	
	Purpose of discussing this issue: 1. To reach a decision?_____ Among whom? _____ For what action? 2. Other:	
	Last date on which discussed: Was a final position taken? Summary of current status:	

and so on. Recall that several specifically identified judgmental tasks were described in the analysis of the overlay model space-planning technique. They were such things as:

What purposes to pursue.
What solution spaces to investigate.
What parameters to consider within each purpose.
What weights to give the various parameters (Alpha-values).
What desirability judgments to make within each parameter (Beta-values).
What relative importances to assign to various purposes (Gamma-values).
What decision weights to assign various participants (Delta-values).
What Aggregation Functions to employ.
What strategies to employ in attempting to reconcile ethical or ought-to-be images with reality in terms of the distribution of decision-making power.

The proposal here is to employ the IBIS as a means of structured and recorded debate in passing the determining value judgments in order to generate proposals and evaluate them using the overlay model space-planning technique described above.

Ideally, a given community might undertake to organize the many forms of data that it collects and files in a unified form that could be automatically converted into the descriptor grid-maps required. Then this data could be used in specific space-planning problems with a minimum data preparation cost. In a forthcoming paper, the author will describe a proposal for ordering urban planning and building data in grid-map format

in order to allow its accessing in question-answering format, as well as to allow its use in a space-planning procedure like the one described above.

An extension of the proposal here is the setting up of a procedure wherein the planner, acting now as an educator and "midwife" rather than as one who passes judgments on behalf of others, could set up his own relatively inexpensive special-purpose mini-computer system with portable input and hard line output devices that could operate over telephone lines and could be carried to significant meetings of interested parties. The system could either be owned by the public planning agency and have stored standard grid-maps describing the major characteristics of the agencies' jurisdiction or it could be owned by the planner who either uses the computer descriptor grids of the planning agency or generates his own grids. At any rate, the system would be special purpose in nature having few functions other than handling CASAT and possibly a major information retrieval system which is highly desirable in planning projects.

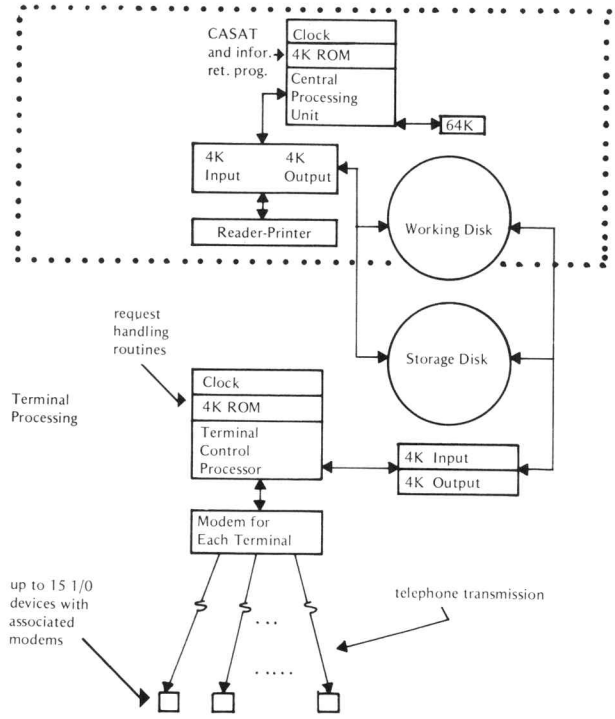
The advantage of using a microprogrammed computer is the ability to achieve the flexibility and characteristics of a large-scale expensive computer, which would be needed in this case, with minimal cost. This advantage is usually achieved by sacrificing the speed of the expensive computer. But the programs for this proposal are relatively small and could be "firmwired"in fast"read only memory" (ROM) devices, thus achieving the optimal use of the system.

The central processing unit under consideration is the Meta-IV built by the Digital Scientific Corporation but similar equipment is manufactured by a number of companies.

The system consists of a terminal control processor and a central processor. The need for two processors is solely for speed. One is devoted to the execution of programs. The other is used to answer requests for

service from terminals. One central processor would be sufficient for processing with only one remote 1/0 device. If the system was expanded to include simultaneous processing at several terminals, the full configuration would be needed.

An interesting possibilty would be the concurrent handling of several interest groups that are assigning various alpha and beta values and recieving their independent results at their own terminals, then at a predetermined time all work could be combined with appropriate gamma values so all concerned get an immediate graphic response to a total consensus.



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THE USE OF GAMING SIMULATION TECHNIQUES AS A MEANS TO STUDYING AND PLANNING REDEVELOPMENT PROCESS IN LATIN AMERICAN URBAN COMMUNITIES: THE S.A.U.C.O. GAME

L.A.E. Breto-Flores

Lucio Arnoldo Estelio Breto-Flores obtained a Diploma of Architecture at the Central University of Venezuela in 1969. In 1972 he received a Diploma in Town Planning and Design Methodology from the Confederation of British Industry and a Master of Urban Science degree from the Department of Transportation and Environmental Planning, University of Birmingham, England. Subsequently, he participated on preliminary work to adapt M.E.T.R.O.-A.P.E.X., a computerized gaming simulation model, to fit conditions in the United Kingdom. He also assisted with the development of the ALEA–YORK/BATH Gaming Model, which is a manually controlled gaming simulation exercise designed to examine problems inherent in preserving an historic city center in the latter part of the twentieth century. Mr. Breto-Flores is curerntly the principal investigator of the Program for the Simulation of Urban and Regional Systems at the Institute of Urban and Regional Studies, Simon Bolivar University, Caracas, Venezuela. He is presently adapting M.E.T.R.O.-A.P.E.X. to the Venezuelan planning context. He has primarily been involved in the use of cross-impact analysis, systems analysis, and scenario writing both as a methodology for generating and amending complex models.

THE USE OF GAMING SIMULATION TECHNIQUES AS A MEANS TO STUDYING THE PLANNING AND REDEVELOPMENT PROCESS OF LATIN AMERICAN URBAN COMMUNITIES: THE S.A.U.C.O. GAME

Introduction

The game is designed to provide some insight into the manner in which the planning and urban renewal process occurs in Latin American communities. Very briefly, the goal of the players in the gaming simulation exercise is to design and develop an urban renewal project or program for an existing community of 40,000 people in an area of 62 Hc. The S.A.U.C.O. Game is part of a study concerned with the analysis and exploration of the different social, economic and political problems which arise during the planning and redevelopment process of Latin American urban communities, with special reference to a case study in Venezuela, The San Agustin Community - Caracas.

Simulation and Games

Simulations are only analogies of a past, present or future real life phenomena. Games could be said to be formalized conflicts in which alternative strategies are studied in order to solve a conflict situation. They involve a fixed set of rules. The convergence of these two techniques is gaming simulation, which is mainly concerned with the development of alternative strategies to try and solve conflict situations with a parallel manipulation of a certain number of variables that are set-up in a given controlled environment. Gaming simulation is then an operational concept which could be easily transferred into a Game by establishing an operational structure in order to study the different aspects of a problem and possibly forecast the outcomes of alternative strategies of action.

Theoretical Basis of the Exercise

The gaming simulation exercise has two main purposes:

To provide an environment whereby participants may learn about the total situation through the medium of their own experience, knowledge and intuition, as well as gaining an understanding and awareness of the process and conflict situations involved in the area under study.

To assess, evaluate and pretest the urban renewal program proposed for the San Agustin community.

It was thought, that the achievement of these two main purposes would depend on the following intrinsic objectives:

To get participants to exercise their judgment, knowledge and intuition of a particular situation, so that they can evaluate their own and other's performance as well as assess and evaluate decisions and actions during the rounds of play.

To get participants to exercise their judgment and assessment of situations within a structure of conflicting values and objectives, so that they are able to establish probable reactions and social outcomes as a consequence of particular decisions and actions taken by antagonistic groups in terms of objectives.

In our exercise, we have tried to apply a systems approach to the study of the social conflicts of the problem area. Therefore, the essential elements of the social matter have been determined. Though we are aware of the fact that the selection of these essential elements are subjective —or a matter of choice for the designer of the exercise—and many

of the elements which have been selected may be difficult to measure or quantify. But social conflicts do appear in social systems and usually social systems very often include one or more physical systems so these social systems may be tackled by systems theory using sub-models with quantifiable data.

The type of data which has been included in our system approach to social problems are those like values, attitudes, preferences, etc.; the significance of this type of data, we know, is difficult to express in numerical terms of the typical systems model. However, the necessary evidence which proves the occurrence and measurement of certain intangible events has been produced with the help of certain sub-models of evaluation which include quantifiable data.

Perceived and Interpreted Reality as a Concept of Socio-Political Planning Games

Role definition in gaming simulation requires a full understanding of the basic patterns of perception of the aspects of social reality that are relevant to a particular role. This requires a particular knowledge of the social reality the role performer shares and of the place he occupies in the structure of society.

Consequently, we think that if a role is to be significant in a gaming exercise then information about his perception of reality must be included in it, otherwise the actions, decisions or, in short, the performance of the role will not reflect the social behavior he is meant to portray. In this study it was intended to avoid this methodological problem by including that type of role information about perceived and interpreted reality which allows the presence of the ambiguity that makes real social systems difficult to understand.

But the information about the form in which social reality is perceived and interpreted would differ for different players. In other words, given a particular situation the events, activities, and objectives of that situa-

tion may mean different things to different people. Reality in this case may vary in its interpretation and perception. This phenomena is not new and it has been called by Schutz (1969) "Multiple realities".

Nevertheless, for semantic reasons in our study we have defined it as differing perceptions and interpretations of "a reality", though it is not intended to establish a unique and individual definition of the phenomena but rather to stick to a terminology which adapts more closely to the particular situation in our problem area. This differing perception and interpretation of a reality arises particularly from differing objectives. If people have different objectives in a particular situation, they may perceive different aspects of reality as more relevant than others. Consequently they may interpret and evaluate the outcomes of the situation differently, based on their previous experience and knowledge of reality.

C. Greenblat (1972) pointed out: "Multiple realities often arise among those variously situated in the social structure with respect to threats, dangers, and liabilities they are exposed to as well as the alternatives open to them. To understand social reality one must understand not only the social structure but the different images of reality that individuals have so that types of behavior can be identified." In this exercise, it was intended to outline the main constraints and opportunities that characterize the behavior of the member of the urban community subject of study. We also tried to outline—according to C. Greenblat's method—a role definition matrix in order to show how all agencies which are involved in the exercises define their situations and the events that transpire them. In this way we hoped to design a model that would operate like the real life system of the problem area, in that it will simulate both the structural elements and the differing perceptions and interpretations of reality of the agencies involved.

Objectives of the Study

The basic objectives of the study can be expressed as follows:

To explore the use of gaming simulation techniques in the development of tactics and strategies of action when conflict situations arise between urban communities and planning organizations in a specified environment.

To provide a mechanism which will permit urban community groups as well as planning institutions and non-community groups, to test the effect and consequences of particular strategies of action when facing social, economic or political conflicts as a result of an urban renewal program in a Latin American community.

Methodology of the Gaming Simulation Exercise

In order to achieve the above stated objectives, it was thought that a simulation of a real situation of conflict in a Venezuelan community would be the best way of assessing the use of gaming simulation techniques as a means to studying the planning process of an urban Latin-American community. The simulation would be one which involves a number of agencies and groups, each making decisions which may affect the situation on a particular problem related to the "whole" framework. Each group would base its decision on an assessment of the situation related to their own interests. An environment would be provided within which the relationships between decision-making, and the interests and objectives of given groups in a changing situation, can be explored.

Areas of Research

There were a number of areas which we thought should be researched so that a comprehensive assessment could be given about the feasibility of use of gaming simulation techniques. These areas of research can be described as follows:

a) Would it be possible to use Planning Gaming

Simulation (P.G.S.) as a tool for identifying social conflicts in the process of urban redevelopment of squatter areas?

b) Is it, in fact, possible to use P.G.S. models to lay out strategies of action by both community and non-community groups?

c) Would it be possible to use P.G.S. for identifying the relationships that can exist between public bodies and private enterprise in the process of urban redevelopment of squatters areas?

d) Is it possible to use P.G.S. models for identifying the interaction that can exist between political, social and economic pressures in the process of urban redevelopment of squatters areas?

e) Would it be possible to use P.G.S. models for identifying the key decision-making elements in the process of urban redevelopment for squatters areas?

f) Is it possible to use P.G.S. models for teaching the community to find out the impacts that group action could have on the decision-making cycle of the Planning Process?

g) Would it be possible to use P.G.S. models for teaching and training community groups and leaders to become aware of the potential use of the technique for self-planning of urban communities?

Principle Topic of Discussion

The principle topic of discussion in the exercise is the assessment and evaluation of the consequences of an urban renewal program which has

been presented by the Local Authority for the San Agustin community. It was suggested that three main courses of action would be followed to attain the intrinsic objectives stated previously:

The assessment and evaluation of the "attractiveness" of the community under the urban renewal program conditions, in terms of its economic, social services and environmental improvements.

This assessment and evaluation would be carried out in relation to the operation of certain numbers of "sub-models of evaluation".

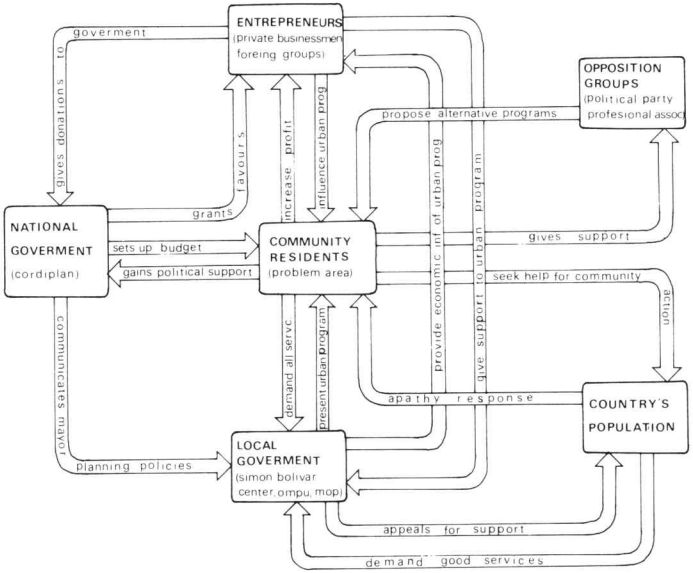
Simulation Components The simulation exercise is formed by five basic components:

Operative Network Models: There are two in the exercise. One which describes the conventional and traditional pattern of inter-relation (i.e. information flows, decision points, feed-back loops, etc.) of the agencies involved in the planning process. This network model is called "Conventional Diagram of Functional Inter-relations". The other operative network model describes and defines the operational design of the game, and it is known as the "Operational Diagram of Functional Inter-relation".

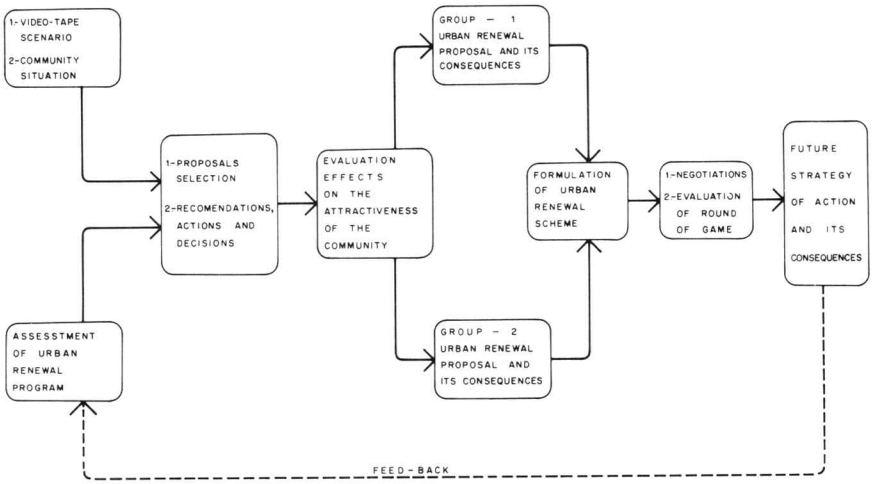
Submodels of Evaluation: They are designed to provide the grounds for bringing together a whole set of factors or variables, as well as actions and decisions which are taken by the different agencies involved in the exercise as part of a total situation. In other words, they provide both the accounting system for the exercise and the criteria and bases upon which judgment about a given situation may be exercised. There are, in fact, four submodels of evaluation:

Socio-Economic Submodel at City Level
Socio-Economic Submodel at Community Level

CONVENTIONAL DIAGRAM OF FUNCTIONAL INTERACTION



OPERATIONAL DIAGRAM OF FUNCTIONAL INTER-RELATIONS



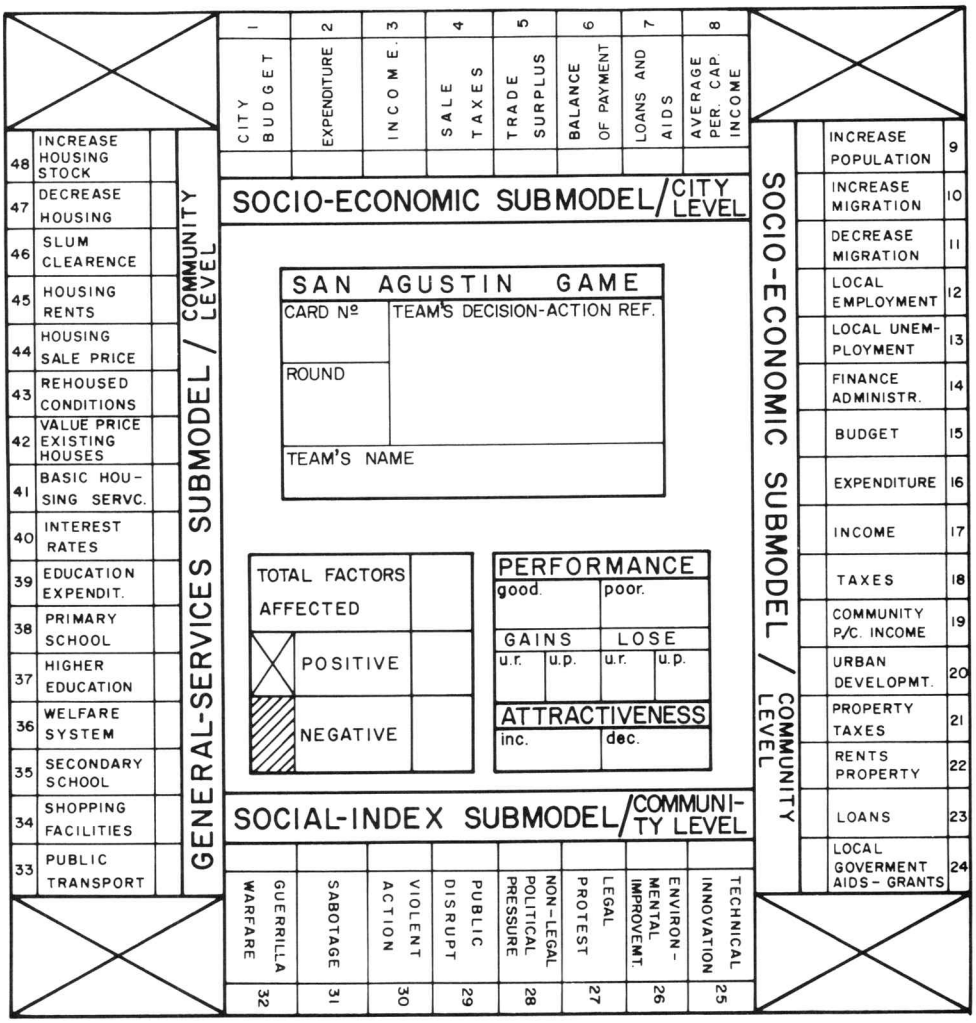
GAME OPERATOR-ROUND EVALUATION AND CONTROL CARD

	TEAMS	PERFORMANCE		NEGOTIATION		RESOURCES INVESTED			POWER GAINS		POWER LOSES		TOTAL		GAME STRUCCTURE	
		poor	good	persuaded	persuader	inf.	proposal	left.	u. inf	u. res	u. inf	u. res	u. inf	u. res	↓	↑
1	NATIONAL GOVERMENT						30	25					7	25		
2	LOCAL GOVERMENT			4			20	20			1	10	4	10		4
3	ENTREPRENEURS						25	25					6	25		
4	COMMUNITY RESIDENTS				2		25	5	7	70			7	75	2	
5	OPPOSITION GROUPS						25	5					1	5		
6	NATIONAL PRESS															

ACTUAL U. INFLUENCE		U. RES.
National Goverment	7	55
Local Goverment	5	40
Entrepreneurs	6	50
Community Residents	1	30
Opposition Group	1	30

ROUND: 1

SUBMODELS OF EVALUATION CARD



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© 'NEXUS', COPYRIGHT 1970, R. H. R. ARMSTROG M. HOBSON

General Services Submodel
Social Index Submodel

The basic operation of these submodels is based on the "NEXUS" Technique and Format, (R.H.R. Armstrong, M. Hobson) - see submodel evaluation card included.

The Roles: The roles represented in the gaming simulation exercise included:

The Central Government role, represented by a team of no less than two players and no more than four players. They act on behalf of the Office of Planning and Coordination of the National Central Government.

The Local Authority role, represented by a team of no less than two players and no more than six. They represent and act on behalf of a number of local authorities departments.

The Community Residents' role, represented by a team of no less than two players and no more than four. Obviously, they represent the general interests of the community.

The Entrepreneurs' role, represented by a team of no less than two players and no more than four. They act on behalf of and represent the interests of Industrialists, Local Groups, Foreign Investment Groups, and Individual Land Speculators.

The Political Opposition role, represented by a team of no less than two players and no more than four. They act on behalf of political parties of opposition who oppose the policies of the Central Government.

The National Press role, represented by a team of no less than two players and whose function is to keep the country informed of all major issues occurring in the community.

A role definition matrix was outlined, so that information about how teams characterize themselves and one another could be included within the exercise as part of the reality which surrounds a particular role in the real life situation. Such role matrix contained information about every role in three basic subjects:

Political orientation of the role in question as seen by itself and by the other roles.

Role's power as seen by the role in question itself and by the other roles.

Definition of the general conditions of the community as defined by the role in question itself and as defined by the other roles in the exercise.

The Scenario and Formulation of the Problem:

The description and definition of the situation in the problem area was given to the teams in two basic parts:

A general framework for the exercise as a whole which mainly contained information about the

origin and antecedents of the situation, historical background, analysis of the problem, statistical information, maps, diagrams.

A second and more detailed part which included information concerning the roles to be played by the various teams, some points of reference as to their future actions and commitments, as well as basic information concerning the latest behavior and actions which have been taken in real life by the groups involved in the real problem.

Formulation of the Problem

The basic problem or conflict in the San Agustin community is real and all information, data, opinions, etc. have been taken from original records of actions and meetings held in the community in which the conflict is taking place. San Agustin is a community located in the very center of the city of Caracas. It can be said that 74% of the area of San Agustin is occupied by squatters (ranchos) with its respective, precarious, lack of basic services. The community's population is approximately 60,000 people, spread over an area of 62 Hc. The absolutely precarious conditions, or indeed the absence of basic services, added to the intra-human conditions of the existing housing situation, produces the typical problems of the Latin American squatter areas, i.e. juvenile delinquency, crime, corruption, prostitution, etc. The socio-economic status of the community is considerably low. It is basically a working class community with high unemployment levels. Local authorities decided to put forward an urban renewal program which included the expropriation of most of the land in the community in order to build a grand park of 35Hc. and a gigantic housing estate of 10,500 dwelling units in towers of twenty-eight and thirty-five stories high. The community claimed that this renewal program proposed by the local authorities would bring problems such as: partial or massive dislodging, rehousing in areas with similar or

worse problems than those of San Agustin, and isolation from their places of work and social contact.

Furthermore, they also claimed that they have not been given a participatory role within the urban renewal program. The inhabitants of the community have been trying to convince the Local Authorities of the need to consider their prime needs. Letters and legal protest have been carried out. However, the scheme has the "go-ahead" of the Planning Authorities and the inhabitants of the community continue to live in uncertainty about their future.

The Game's Manual

The sequence of the game is expected to be of 2¼ hours of playing, which represents five years of real time. The 2¼ hours cycle is one round. This round is subdivided into four basic periods:

The Assessment Period	20 minutes
Initial evaluation and program formulation period:	30 minutes
Planning and negotiating period:	45 minutes
Final evaluation period:	15 minutes
Total:	125 minutes

The Assessment Period

Assessment of a list of proposals of the urban renewal program proposed by the Simon Bolivar Center are carried out by each team, according to implementation requirements in terms of time, space and resources of the proposals. Particular recommendations about the scheme are made by each team, as well as probable decision and actions to be taken by them. This stage will lead to a clear identification of the team's opinion and policies about the proposed urban renewal program.

The scheme's proposals will be listed and they will have a price or amount of resources to be implemented or carried out. At the start of play each

team will have a certain amount of resources, and in successive rounds of play it varies according to the power or units of influence they possess. This will show the power each team has in relation to the other to implement the program's proposals. The next step in this operation is for the teams to identify those factors of the "sub-models of evaluation" which are affected as a consequence of having chosen a set of proposals.

Initial Evaluation and Program Formulation Period

General evaluation of each team's assessment about the program is made by the two appointed conflict groups. The first conflict group is composed of one representative of the Central Government team, one representative of the Local Government bodies, and one representative of the Entrepreneurs groups team. Conflict group no.2 is composed of two representatives of the Community Residents team and one representative of the Opposition Groups team. Each conflict group may choose one proposed out of the list of ten and establish the social, political and economic consequences of it. Record of this evaluation and program formulation period must be kept by filling in the consequence evaluation card provided.

Planning and Negotiation Period

During this stage each team is provided with the two proposals selected by the appointed teams. Negotiations among the different teams will take place on those issues which represent conflict points in program policy matters. Therefore, at the end of this operation a redistribution in the power or units of influence pattern might occur as a consequence of persuasive maneuvers of particular teams; in other words, teams will gain units of influence or power from their competitors.

On the other hand, teams may lose units of influence and resources due to poor performance, which in turn will be judged by the game operator, who will rely on the operation of the "Submodels of Evaluation" to exercise his judgment. A positive or negative increase effect respectively in the variables included in the Submodels of Evaluation will lead to an increase or decrease in the "attractiveness" of the community.

Therefore, a team which has gained power as a result of persuasive maneuvers during the negotiations, could either equal or exceed the number of units of influence of that team which has lost power due to its poor performance. When this happens, then the team which has been equalized in its units of influence by a competitive team must lose its role place in the structure of the game. Such changes in the structure of the game must be recorded by the game operator on the form provided.
During this stage teams may also request any necessary information from the game operator, bearing in mind that each request for information card has a price of five units of resources plus five units for each item requested.

Final Evaluation Period

This period is provided for the teams to give a final evaluation of the total situation in terms of social, economic and political consequences for the proposed program after negotiations have occurred. The particular policy position of each team and the most current description of the actual situation must be clearly defined. This description will form the initial ground for the next round of play.

The Gaming Simulation Model Description: Game Participants

The participants of the game were mainly postgraduate students and some members of the staff of the Transportation and Environmental Planning Department, University of Birmingham. The total number of participants in the gaming simulation exercise was fifteen. The age of the players ranged between 23 and 35 years.

Communication Techniques Used in the Gaming Exercise

In order to have a record of the team's activities, we decided that the following items should be included in the exercise:

1. A packet of six forms or cards was provided for each team, so that they could communicate to the control operator table all their activities.

2. A cameraman with a video-tape equipment was provided, who could move all around the room. This T.V. equipment was used to simulate open forum and television interviews, through which players could openly express their opinions about a particular issue to the nation in general.

3. Verbal communications at all times during the exercise were fed into a tape recorder.

On the Data Collection Devices Used in the Gaming Exercises

During the exercise four basic recording devices were used:

The Special Cards

These included:
An assessment card
A submodel evaluation card
A consequence evaluation card
A negotiation card
A record sheet card
A post-negotiation evaluation card

Each of these cards contained information about the name of the team, number of the card, round of game and date of the exercise. The cards were basically used to collect and record all information concerning team's strategies of action, decisions, recommendations, assessment of situations, etc.

The Round Evaluation and Control Card:

To evaluate a round of the game a special device was created which we named "Game-Operator Round Evaluation and Control Card" (see example of card included); this device would also serve as a "Decision-Strat-

egy testing Matrix", namely, by using this matrix it would be possible to test if the decision or strategy of action taken by a team has in fact been an effective one; did the team lose power and resources as a result of its strategy of action or did it win them? This card was designed upon two main assumptions:

Decisions and strategies of action can be evaluated in terms of the rewards or losses that they might bring to a team as a result of their activities during the game.

To study human behavior by observing players' reactions to those events which in one way or another obstruct the achievement of their own interests, objectives or goals. A number of parameters have been taken into account in the design of this Round Evaluation and Control Card:

1) Performance: This parameter is measured by the game operator according to what the particular team has scored in the "sub-model of evaluation" card.

2) Negotiation Behavior: This parameter is measured by the game operator according to the behavior of the players during the negotiations. It aims to identify which team has been the persuader or the persuaded during the negotiations.

3) Resources Invested: This parameter is measured by the game operator, and it gives an

indication of the way in which teams have spent their resources and more important whether it has been consistent with future implementation requirements needed to have a continuous pattern of resource investment.

4) Power: This parameter is again measured by the game operator. It gives an indication of the rewards and losses that a team may have as a consequence of its performance of negotiation behavior during the round of game.

5) Game Structure: This parameter is included to record all changes in the game structure which are produced by the evaluation of all those parameters described above. This, in the end, will give an indication of: How effective or rational was the particular decision or strategy of action taken by a particular team? What was the final result of its action or decision?

Outcome of the Experiment

According to the results obtained in the simulation, it can be said that a considerable degree of similarity was achieved. The model did, in fact, resemble the real life situation of conflict of the San Agustin community. The representatives of the model can best be seen when comparing the results of the activities that went on during the exercise with the real life situation of conflict described in the scenario. Over 60 percent of players considered that the gaming simulation exercise was reasonably real. These are some of their answers: "All participants involved in the game took

their positions quite seriously". "Reasonable, so as in real life. The influence and power aspects of the game contribute quite considerably to make the game real". "When knowledge of the game became familiar, time was not long enough for players to continue to get a higher degree of involvement; had the time been longer the exercise would have been more realistic". "It is difficult to become involved with your role when you play with people you already know".

In general, the game provides an effective structure in which events and activities take place at different times with a dynamic involvement of participants. Some players felt that what made the game dynamic were two things: First, the negotiation period, because of the form in which teams were confronted with each other. Second, the power factor of the game permitted them to actually take over other players' positions, and see how the structure of the whole game could be changed.

These types of comments by players are clearly confirmed by the results of the game itself, and by tracing the video-tape and recording transcriptions of the negotiations or newspaper interviews. In fact, 90 percent of the players thought that the game provided a dynamic structure of events. The following are some of their answers to the questionnaire: "The second round of the game was very dynamic, because players had more confidence in themselves. They knew more about the total situation and the dynamic mechanism of the game." "The game is quite dynamic in terms of time; the existence of a stepping process to carry out the activities contributes considerably to make it dynamic". "The whole situation of the game is dynamic. It was actually a real situation. . ." "All players tried to make the situation real and therefore dynamic". "The negotiations period is very dynamic as the different teams are confronted with each other". "The dynamism of the game lies on the urgent solutions put forward in the urban renewal program".

The fact that teams did not share the same information about the total situation of conflict of the community and therefore they had different "interpretation and perception of the reality" of the game, made the gaming exercise resemble considerably the real life situation of the San Agustin community. The concept of "differing interpretation and perceptions of a reality as a new game, produced in the players a high degree of uncertainty about the total environmental situation of the exercise. This uncertainty corresponds in a real-life situation to the difficulties and uncertainty faced by the agencies involved in the planning process when trying to understand the social behavior of those members of the social structure of the community they are trying to plan for. It also corresponds to the difficulties faced by these agencies when trying to identify the images of reality that other institutions of planning agencies carry, and which ultimately make them adopt certain kinds of typical behavior during the planning process. With regard to this aspect players' answers were: "Information about the reality of the situation in the San Agustin community was misleading and ambiguous. I think my information about the situation was different to those of other teams". "There was some lack of information about the right role of the Entrepreneurs. At times I did not really know what they wanted". "My information about the general conditions of the community was different to the information of the other teams. It was misleading!". "Also I didn't know why any team loses its power, although I think that the power was highly related to the wealth of each team". "I felt very uncertain because different people had different interpretations of the game".

With regard to the planning aspect and according to the results of the exercise, the San Agustin game has a number of potential outcomes which can prove to be of great help for those agencies involved in the urban redevelopment process of squatters in Latin American communities. It is thought that the game helps to identify planning strategies of action. It was possible, through the game, to explore and identify the key decision-making elements in the urban renewal process. Player's opinions about

the implications of the gaming exercise for urban planning policy was tested; the type of answers obtained were of this sort: "It helps the planning policy-makers to be aware of the probable reactions of those agencies involved in the planning process, and, therefore, to be more cautious about their decisions as well as to begin to study social problems that might arise as a consequence of a particular planning policy". "It would serve as a guiding device for planners and the outcome of the gaming exercise could possibly be one of the solutions to the particular urban problem under study, although not necessarily the best or more practicable solution". "...It explores the number of probable solutions that might be given to urban renewal problems". "You can get an idea of how such urban renewal problems can be solved".

It is interesting to notice that 90 percent of the players considered that the San Agustin Game can have significant use in the following areas:

Teaching planning students.
Identifying the social conflicts caused by urban renewal problems.
Teaching community members to organize group action in order to influence decision-making bodies.

Some 70 percent of the players considered that the game can also be used to explore the relationships between public bodies and private enterprise during the planning process. However, only 40 percent of the players considered that it could have a significant use in such fields as:

Urban policy testing device in Local Authority.
Self-planning urban communities.
For laying out strategies towards citizen participation in the urban renewal process of squatters communities.

A Brief Discussion of the Experiment's Outcome

It is difficult to assess the potentialities of the game and its outcome with only two rounds of game played. In fact, many outcomes of the gaming simulation exercise remain to be examined in more detail. It would be naive to try to interpret those outcomes that we have already examined without any reservations; simply because there were a number of constraints which undoubtedly affected the results of the gaming simulation exercise. The main constraints and difficulties were:

The very small number of rounds of game that were played. This no doubt greatly affected the validity and reliability of the study. Two rounds of the game gave us a very restricted amount of evidence on which to base judgments of the feasibility of the game itself. However, we do not pretend to consider the results of our gaming simulation exercise and particularly those results of the San Agustin Game as conclusive; on the contrary, we just consider them as a starting point or pilot study to what can be called in a Latin American context "Socio-Political Planning Games".

The lack of proper space to carry out the exercise. Some players thought certain activities of their roles ought to be performed with more privacy.

The use of testing questionnaires becomes another item that may have influenced the results and validity of the gaming simulation exercise. The use of testing questionnaires has one main difficulty and this is "subjectivity". People when filling out such questionnaires tend to be ambiguous;

and if they are asked to rate any particular item, then they tend to be emotional in their rating. However, such difficulties can be avoided by playing the game several times, and also having different players in each occasion.

Players were all from different nationalities. Group behavior is greatly affected by the differences of the members of the group, particularly when such differences are cultural in terms of nationalities or economic in terms of status.

The conditions of real group behavior can be best achieved if real subjects or people who are familiar with both the environment and the Latin American socio-political context are used for playing the San Agustin Game.

Conclusions

The events and actions which took place during the game, as well as the proposals laid out in the urban renewal program which was accepted by the teams, suggest that the basic social problems of the community in question were clearly identified throughout the urban renewal process simulated in the game.

It is clear from the results of the first and second rounds, that the agencies involved in the gaming simulation exercise did actually establish clearly their strategies of action. The Game also allowed players to assess the effects of their strategies on the general conditions of the community; they could actually see the effectiveness of their strategy according to the rewards of penalties imposed on them as a result of their actions and decisions. However, players' activities during the two rounds of game and the outcome of the exercise constitute strong and considerable evidence to say that planning gaming simulation models and

indeed the San Agustin model could prove to have very successful results, if used as a tool to lay out strategies of action by all agencies involved in the planning process of urban communities.

For example, from the results of the "open discussion" which went on during the second round of the game, it is clearly seen that a number of important issues were raised, e.g. citizen participation, role of the entrepreneurs in the planning process, economic problems of under-developed countries and the responsibility of Local Government in front of such problems, etc. Therefore, we believe that the game does in fact help to identify the basic relationships that can exist between public bodies and private enterprise in the redevelopment process of squatters areas in a Venezuelan community.

The outcome and actions during the game suggest that planning gaming simulation models is highly useful in the exploration and identification of the key decision-making elements in the urban renewal process of squatters areas.

Players did certainly get involved in the situation. This can be observed in the video-tape by the type of discussion which was held during the negotiation period of both rounds of the game. The fact that negotiating with other teams implied that teams could in fact get the support of other groups, and therefore become stronger in political and economic terms, meant that players would feel more motivated to look for group action. All this seems to suggest that it would appear to be possible to use planning gaming simulation models for teaching all agencies involved in the planning process particularly groups, to find out the outcome and impact that group action could have on the decision-making cycle. On the other hand, players' opinions after the rounds of the game seems to reinforce this optimism, since over 80 percent of them saw a significant use of this game to actually teach the community the advantages of group action.

One of the fields in which this kind of gaming simulation exercise would have a relevant use and which will open a new dimension in planning is in the area of self-planning urban communities. The results of the game suggest that it is possible to discuss and lay out an urban renewal program. The game provides the necessary structure to bring out the important planning issues of a given community, and the necessary framework where these issues can be discussed.

The dynamic factor of the exercise by which the structure of the game changes with respect to role positions, allows the groups involved in the exercise to assess and evaluate their strategies of action in terms of the achievement of their own goals and objectives.

Finally, it is necessary to point out that at present further research and improvements of the S.A.U.C.O. game are being carried out at the Simon Bolivar University, Institute for Urban and Regional Studies in Venezuela. This includes the possibilities of making the game machine-operated (computer) rather than manually operated as it is at the moment.

On the other hand, part of our research work at the Simon Bolivar University includes the modification and adaptation of the computerized gaming simulation model M.E.T.R.O.—A.P.E.X. to the Venezuelan Planning Context. Therefore, we are considering the feasibility of making the S.A.U.C.O. game machine operated so that it con be incorporated into the M.E.T.R.O.—A.P.E.X. model.

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THE EVOLUTION OF A PLACE TO DWELL: ANATOMY OF RESIDENTIAL SITE AND DWELLING DESIGN AS A PARTICIPATORY PROCESS AND PRODUCT

Hanno Weber

Hanno Weber is a graduate of the School of Architecture and Urban Planning, Princeton University, and has been a Research Associate for the Joint Center for Urban Studies at the Massachusetts Institute of Technology and Harvard University. Mr. Weber is a registered Architect in the state of New Jersey and has also served as an Assistant Professor at Princeton University. There, he worked with the "People's Workshop," the Community Design Center of the School of Architecture and Urban Planning. During this time he worked on several participatory design and planning proposals. Most recently, Mr. Weber was awarded the Graham Foundation Fellowship in Applied Design Methods at the Design Activity International Conference of the Design Methods Group and the Design Research Society. He is currently an Associate Professor at the School of Architecture, and the director of the Joint Architecture/Social Work Program and Community Design Workshop, at Washington University, St. Louis, Missouri.

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THE EVOLUTION OF A PLACE TO DWELL: ANATOMY OF RESIDENTIAL SITE AND DWELLING DESIGN AS A PARTICIPATORY PROCESS AND PRODUCT

Background

Much of the design activity loosely referred to as residential site planning is usually focused on the resolution of environmental factors, methods of production, compositional criteria, evident functionalism, economic optimization and logistical packing problems. These concerns, the legacy of utilitarian and remedial interventions to combat nineteenth-century excesses, have produced remarkable normative accomplishments. Daylight, sunlight and ventilation penetrate every habitable room: new sanitary facilities and presumably open space, for the most part have eliminated the inhuman conditions which decimated populations in the past; playgrounds and greens surround buildings and the hazard of vehicular traffic is often removed. Shelter has even been made more available to a broader range of inhabitants in well-intentioned physically healthy (therefore assumed) socially redeeming residential environs.

Yet the quality of life in the architectural products of the Modern Period, which codified most of the utilitarian/biological standards during the last half century, has been less than satisfactory. Traditional social networks (although some argue they are anachronistic) are not accomodated; aggregations of dwellings rarely respond to life styles and cultural values; and the solutions based on logistical packaging, construction determinism or sculptural urban compositions, as well as the crusade for salubriousness have only offered emptiness, uniformity, boredom and misfit.

In the early nineteen-sixties, growing unrest and continued disenchantment with the bio-logistical practices of residential site planning, prompted

some physical designers to react against the shortcomings of their own belief system. Aware that dwellings and their extensions and contexts could not be submitted into formal, logistical, technical or helio-biological preconceptions, designers sought answers in new images, new techniques, and new ideals.

Some dissatisfied with the inadequacies and inequalities inherent in tall buildings amidst bucolic settings seized on the continuous and unassuming urban texture images of vernacular habitat. Cellular buildings hugging the ground, would somehow make shelter socio-culturally appropriate and foster the return of social networks. Others attributed their inability to cope with the multiple and complex factors in the design of dwellings on the lack of reliable information, handling and processing. Scientific discipline, the logic of applied mathematics and the computer would somehow disentangle the vast intricacy of phenomena and avoid ever again making a misfit between socio-cultural factors and physical configurations. Still others reacted ideologically to the role of designers having to make proscriptive decisions about the life patterns and cultural values of dwellers they did not know. To them the path toward congruence and more responsive solutions would be found in the involvement of people, if not actually designing their own dwellings.

Precedents

The images of Mediterranean villages and Hopi pueblos in due course became another stylistic vocabulary onto which were grafted behavioral connotations. And although "low-rise, high-density housing" fell prey to over-simplistic sociological determinism and later to picturesque aesthetic and techno-industrial dogma, it nevertheless contributed new insights to residential site planning.

Horizontal organizations of dwellings demonstrated that in most contexts (within limits) there was really no reason to live off the ground. Cellular buildings, hugging the ground also exposed the uselessness of traditional

open space in the periphery of buildings; even after being manicured and cosmitized they resulted in little more than SLOAP - "space left over after planning[1]." Contact with the ground, however, required accountability and avoiding residual areas since less of the ground was being left open. The extensions of dwellings could no longer be left to chance or a whim, but had to perform the role of a structure of connective tissue. However artificial, the picturesque images of diversity borrowed from vernacular contexts, also suggested an alternative to the clinically pristine objects of an earlier era. Shelter no longer had to be stuffed into Cartesian envelopes and could assume its territorial and cellular identity. Thus in two of the premises of "low-rise, high-density housing"- dwelling as a territorial cell and a structure of settlement as a connective fabric of extensions- residential site planning gained at least an inferred awareness of the interrelationships between behavioral factors and their physical confirmations.

The scientification of design, over-emphasis on procedures and the grafting of technique from without (rather than the evolution of a better understanding of the problem from within) did not resolve the complexity of design nor produce solutions more congruent with the users. "Methodology", despite rigor was too often rendered ineffective by the lack of information. At times it was also transformed into a deterministic tool, far more hindering and circumscribing than the traditional design practices.

But the systematization of design (explicitness and precision) did initiate the demythification of the activity of the architects and planners. Having to be clear in the definition of problems demanded procedures to externilize the design activity; it also required discourse by means of discussion, criticism and argumentation. An objective design dialogue began to un-

1. See Architectural Design, Volume 38, Number 9, September, 1967.

cover structural characteristics of form which were based on systematic interrelationships of topology and geometry. The analysis of morphological implications subsequently contributed new outlooks about design elements as discrete entities and delineated areas of space interdependent with function-objects and activity territories.[2] Thus an understanding of simultaneity, and the generation and combination of components into alternative systems could be based on taxonomic classifications of prevailing physical attributes in components such as size, contiguity, and boundary definition. Systematic problem-solving methods offered residential site planning almost infinite configuration opportunities to match particular socio-cultural contexts. And externalized procedures, as well as design morphology began to make understandable the implications of priorities and trade-offs, and therefore the essential role of values in the making of these judgments.

Lack of a common language, thwarted the desire of designers to involve users in the design activity. In addition, condescending, sentimental or social guilt motivation without the support of procedures and too often the absence of mutual interests inhibited most good intentions to engage inhabitants in the decision about their dwelling environs. "Participation" evidently had to be more than just asking what was wanted or providing de facto "take-it-or-leave-it" choices.

Notwithstanding the limited skill of designers to communicate options and the mediocre solutions which resulted from a equally inept dialogue, "participation" made dwellers realize they could influence their surroundings.

2. Christopher Alexander. Notes on the Synthesis of Form. (Cambridge, Mass.: Harvard University Press, 1964); also C. Alexander et al. A Pattern Language Which Generates Multi-Service Centers. (Berkeley, Cal.: Center for Environmental Structure, 1968); see also N.J. Habraken, "The Pursuit of an Idea", in Plan 3, 1970.

Designers also learned that users have opinions , preferences, aspirations, and expertise about what environs can and should be and that competence did not reside solely in professionals. User inception, however, had to be activated; continued interest and involvement in decision-making had to be nurtured by argumentation and, if necessary, by controversy. Participatory residential site planning had to inform decisions, provide understandable alternatives, make the consequences of choice explicit and cultivate user and surrogate autonomy. Even so, user participation did not necessarily guarantee more congruent solutions; it only approached better fit than proscribed and preconceived answers. It also delegated autonomy over priorities and tradeoffs to the user, thus removing the we-they barriers and assured participants the satisfaction of having made their own value judgments, whether reliable or inaccurate.

Intent and Hypothesis

In residential environs, man as a social being attempts to fulfill his tendency for collectivity; man also exercises his creative potential by the ordering and structuring of habitat, influencing social communication and the collective consciousness. At this fundamental level all men are designers, given their ability to conceptualize spatial relationships, to distinguish physical attributes and to classify entities according to prevailing characteristics.[3] To engage the participation of users of surrogates, design must transform the complex synthesis of physical environs into discrete entities and manageable components; a design process must also provide classifications of common characteristics, associations, and relationships,[4] which lend themselves to raising divergence of opinion. The size, aggregation and contiguity attributes of habitation function/

3. Jean Piaget and Baerbel Inhelder. The Child's Conception of Space. (English translation, New York: Norton & Co., 1967).

4. Alexander Tzonis. Towards a Non Oppressive Environment. (Boston: I Press, 1972) pp. 34-35.

objects and activity territories can convey and elicit functional and iconic associations and meanings.

To be useful, a definition of components on a dwelling site must be reductive but encompasses both use and configuration. One model to address the conception of dwelling as a territorial cell (on a surface or as a volume) presupposes sheltered and open living spaces for an individual or social unit, and specifies the relationships of dwelling to the ground plane and the means of access and service. The disposition of activities within a cell and in boundary margins and zones, furnishes statements about privacy and collectivity or identity and anonymity. Dwelling cells, the private domains, are linked to a framework of shared extensions. In the connective fabric of extensions are found the networks of pedestrian and vehicular movement and common open space for passive and active recreation. Open space and vehicular space, as conceptions and by their relationship to dwelling cells, and their configuration and location, can elicit the nature of activities, the frequency of use, levels of amenity and convenience and symbolic connotations.[5]

Dwelling cells, open space and vehicular space, as entities or activity territories on a dwelling site lend themselves to physical characterization. Each can be sized, dimensioned and allocated a relative proportion of the ground plane. A site area thus becomes a container with an initial capacity which is then altered by the building of additional superimposed surfaces. Allocation of the ground to each component can reflect logistical limits (standards or economic demands), as well as social preferences (building height, amount and type of open space or vehicular access convenience). The frequency of aggregation or interval of sized site components, establishes a grain and texture of development and describes dis-

5. H. Weber. "Dwelling on Dwelling", (unpublished manuscript, 1973) chapter 3, "The Quest for Congruent Design in Dweller Assertions and Designer Reactions".

tribution organization. More specific arrangements to enable and provide clues for the performance of life patterns can be examined in the contiguity of components. Degrees of proximity and coincidence of overlap, are determined by boundaries and links and can approximate configurations. Site capacity, and the distribution and overlap of dwelling cells, open space and vehicular space offer explicit concepts to address dwelling congruence; as argumentative issues they provide a judgmental framework for participatory design, intended to activate the expertise and mediate the values of users as surrogates.

The point is simple: residential site planning has thus far had more to do with proscribed helio-biological factors, methods of production, compositional aesthetics, evident functionalism, economic optimization and logistical packing problems, than with dwelling. The results in environs ignoring socio-cultural values have been predictably dismal. If, however, systematic, simple concepts can be structured into an explicit and communicable decision-making vocabulary for discourse in design, dwellers themselves will be able to act rationally in their own behalf - providing designers assist, relegate judgments to users and surrogates, and adhere to an established judgmental framework.

Definitions and Assumptions

CAPACITY

Capacity is essentially logistical probing as a reflection of amenity in quantitative terms, giving as a product the intensity of development per acre. All components are assumed present on a site and are allocated as area on a per capita (dwelling) basis on a ground plane, natural or man-made; superposition or layering of territories, increases the area of the container. The allocation of space per dwelling includes: sheltered space of a dwelling on the ground plane as a function of average building height; private open space; vehicular space as a function of the car/dwelling ratio, the extensiveness of the road network (a function of distribution of storage) and any stacking; pedestrian access space; and any public recreation

space. Capacity as a product of amenity choices, rather than a density preconception, can be stated algebraically as:

$$\frac{43{,}560 \text{ sq. ft.}}{\frac{Ad}{N} + \frac{AcQK}{V} + \frac{Ad/N}{3} + P^{O} + R^{O}} = \frac{\text{dwellings}}{\text{acre}}$$

where:

Ad = average dwelling area; in normal market distributions of dwellings varying in occupancy from 1 to 8 persons, the average dwelling area given F.H.A. standards) is usually 1,000 sq.ft.

N = the average number of floors of sheltered space

Ac = minimal area for a parking stall sharing a common access and back-up space with another vehicle, or about 300 sq. ft.

Q = road network coefficient; rarely less than 1.5 ins. in double loaded parking lots using back-up space for access; as high as 4.0 in. detached single family houses.

K = car/dwelling ratio

V = average number of stacked parking levels

$\frac{Ad/N}{3}$ = pedestrian access space; generally 1/3 of the area allocated to a dwelling cell, but not less than 100 sq. ft.

P^{O} = area of private open space; when provided a reasonable area is equal to the "living" space within the dwelling.

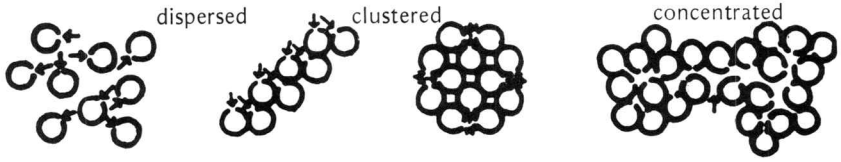
R^o = area of common recreation space; in attached developments private and common open space are generally allocated between 1/3 and 1/5 of the total land per dwelling.

DISTRIBUTION

Distribution of activity territories on a residential site examines component aggregation in graphic form; the frequency or interval of components is represented in arrangements which range from concentration to dispersion as limit conditions of complete agglomeration and total fragmentation (whether random or uniform). Assuming the same scale of consideration, concentrated open and vehicluar space are aggregated in one location; concentrated dwelling cells have no direct connection to the ground plane. Similarly, dispersed open and vehicular space are attached to a dwelling but not joined with other segments to form larger scale realms; dispersed parking shares common access roads. Dwelling cells, however, whether dispersed regularly or randomly, can also be attached in lines or chains to define other activity territories and must have direct access to the ground plane. The idea of a cluster as one (or a series of) intermediate point(s) between concentration and dispersal has no universal acceptance. It can only be a relative conceptual measure established on a project and user basis. Clustered open and vehicular spaces are shared segments forming larger scale realms, related to or defined by aggregations of dwelling cells. Clustered dwellings form identifiable "nodal" rather than "peripheral" aggregations maintaining direct access to the ground. The 3 site components arranged in at least 3 distribution patterns offer (within the limits of packing geometries), 27 combinatorial possibilities, (C^n).

Three alternatives (+) are geometrically impossible; if 2 components are concentrated, there are no available interstices to distribute the third. Four alternatives can be disqualified (*) on the basis of functional redundancy; it does not make much sense to concentrate dwellings and either

disperse or cluster the open and/or vehicular space. Distribution patterns do not have to be limited to homogeneous arrangements.

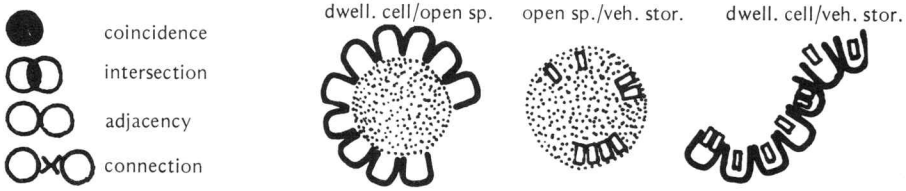


	(dispersed)			(clustered)			(concentrated)		
vehicular space	d			c			k		
open space	d	c	k	d	c	k	d	c	k
dwelling cells	d c k	d c k	d c k	k c k	d c k	d c k	d c k	d c k	d c k

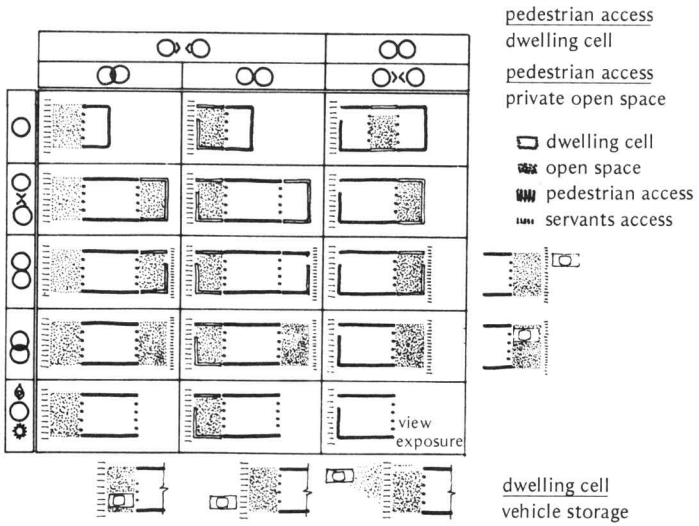
OVERLAP

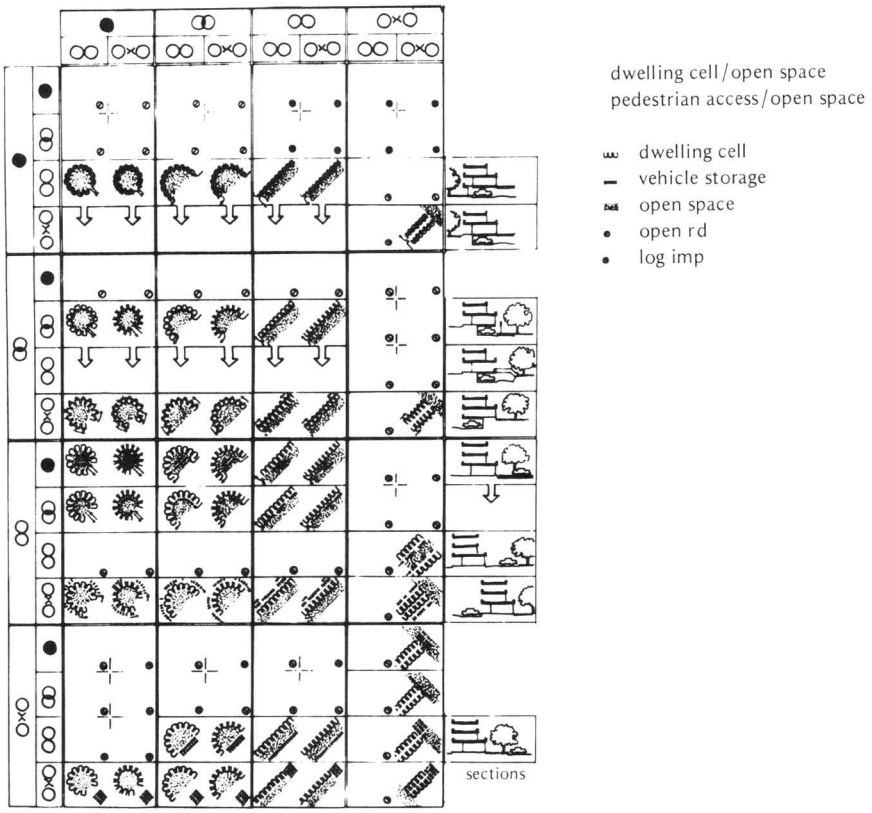
Relationships of contiguity or overlap can be expressed as topological configurations to distinguish 4 conditions at the scale of dwelling aggregations: dwelling cells to common open space; vehicular space to common open space; dwelling cells to vehicular space; and access to the other components (examined by its proximity to open space). Three additional conditions at the scale of dwelling, relate a single cell to its immediate extensions of access, service and exposure, through private open space as mediating element. The generation of alternatives relies on on a range of connectivity and proximity notations for boundary conditions. Coincidence suggests 2 activities occurring within the same realm. Activities spilling into each other and sharing mutual areas across an ill-defined boundary represent an intersection condition. Clear definition of contiguous realms sharing only a common boundary is understood as adjacency. And linkage of 2 territories across a third mediating realm is described as connection. The application of overlap conditions requires additional qualification. In aggregated dwellings, dwelling cell/common open space relationships are understood to mean containment of open space by dwellings. Unions and proximities of vehicular space/

dwelling cells are defined as superposition or stacking; and the contiguity of vehicular space/open space, means either the layering of open space vehicles or the degree of mix on a common surface.



Overlap relationships between a single dwelling and its extensions are generated by examining contiguity of access and linking or buffering private spaces. The condition of coincidence is disqualified as operationally incompatible. Combinations of relationships offer 15 options which can be expanded by the introduction of vehicular space; however, this condition is best addressed at the scale of dwelling aggregations.





The bounding of open spaces, the combination of territories, and the superimposition of land uses, provide the overlap conditions to generate alternative dwelling aggregations. Combinations of relationships offer 144 possibilities, of which 66 are reasonably feasible. Disqualified options are either logically impossible (o), or operationally incompatible (o), e.g., if dwelling cells and open space are connected, then access and open space can not be adjacent (nor interested or coincident). Similarly, adjacency between dwelling cells and vehicular space precludes adjacency between vehicular space and open space, unless the open space is con-

nected. Operational incompatibility is evident where coincidence (superposition) between dwelling cells and either intersection or coincidence between vehicular and open space, would require the covering of open space.

Capacity distribution and overlap are intended to be examined sequentially as successive approximation of physical confirmations of user and/or surrogate values. As aids to design, based on physical attributes of function/objects and activity territories, they provide an iterative decision-making agenda; but the sequence also accommodates retracing. By the sizing and topological positioning of realms which evoke and activate preferences and meanings, the process serves as an interactive device, which performs both programmatic and synthetic tasks simultaneously. The intended formal product is a spatial and territorial structure for a residential site, a framework of connective tissue, within which dwellings are integrated. This framework or parti then has to be adapted to a given context and developed into a concrete implementable physical solution. Development includes the structuring of activities and functions within the accepted dwelling cell territory, affected by the pre-established dwelling extension criteria, a building fabric system, the micro-climate and the reality of economic constraints.

Application

The previously defined participatory and transactional design process was applied and developed on a sponsorship proposal for the George Street Urban Renewal Area, New Brunswick, N.J. by the Urban League of Greater New Brunswick and The People's Workshop (a community design collaborative). A community task force, composed of Urban League and other community group representatives, as well as interested neighbors and residents of the development site and potential new inhabitants, served as surrogates meeting on a weekly basis for a period of 4 months. Attendance varied from 15 to 25 persons of which 6 to 8 attended regularly; about 100 people participated over the entire period of development.

Three architectural students and this writer served as the design staff, and an economic consultant, an attorney, a prospective contractor and an architect-of-record volunteered their services in hope of being eventually retained as commissioned consultants. Developing a proposal through participation was motivated by the leadership of the Urban League and the community task force concerns to make available culturally and socially congruent dwellings for low-income residents. Direct involvement in the design and decision-making process was equated with obtaining control over physical surroundings and lives and a means to strive for greater economic participation of minority citizens in the building industry.

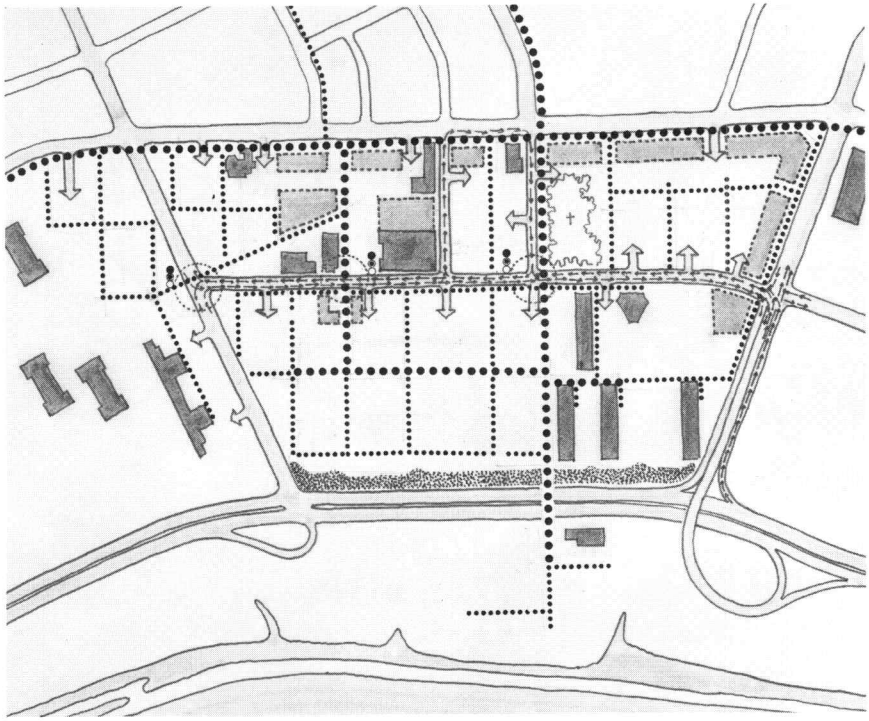
Context and Program

The sloping, 9.8 acre urban renewal site (condemned 8 years earlier, awaiting development sponsorship and not yet cleared) is located on the deteriorating edge of a city core, immediately adjacent to an arterial road, which separates it from an inaccessible riverfront park. On two of the boundaries are high-rise residential projects, one of which is public housing, and the second (across a distributor street) is a subsidized previous renewal effort. Along the remaining boundary street are potentially reusable institutional facilities. Through free-wheeling discussions during the initial meetings, in which the design staff offered factual evidence on the site and its surrounding context, the task force established a development program and objectives which included:
*a pedestrian link (bridge) to the riverfront park by a grade-separation crossing; *a protective buffer (planted earth berm) from the arterial road; *controlled pedestrian connections to the surrounding residential areas; *provision of personal service and convenience shopping on the site; *rationalization of the vehicular network and site access off a single, widened feeder street along the institutional site boundary; *incremental development as infill or in phases to permit any necessary relocation with a minimun of disruption and inconvenience.

Income limits under available funding programs and correlated household size distributions for the city, as well as shelter demands, furnished the basis for a logistical program. The dwelling/household distribution adopted by the task force included: 20%, 1-2 persons (600sq. ft.); 30%, 3-4 persons (750sq.ft.); 20%, 4-6 persons (950sq.ft.); 15%, 5-8 persons (1,250sq.ft.); and 15%, 8-10 persons (1,400sq.ft.).

Site Development Discourse

Context and program objectives revealed two clues for the development of the site: a link to the riverfront park offered considerable freedom in the allocation of open space within the site; the relocation policy also suggested a grain or texture of cellular development enabling incremental implementation. Subsequent discussions uncovered task force attitudes, preferences and preconceptions about each of the site components. This was an unquestionable rejection of high rise living. Home ownership meant house with a private yard, where one could open the door and let children and pets out, and have an assigned place to park. Walk-up apartments not higher than 3 stories were considered acceptable as long as there were few dwellings sharing a stair, to avoid conflicts over maintenance. A house was considered a place of safety, a shelter from danger and external threats and a place for protecting the household and its belongings. The car, as an essential and principle possession, not only had to be convenient to the house, but also located in such a way that it could be casually supervised by either its owner or neighbors. Large parking lots were impossible to supervise, inconvenient to dwellings and inadequate for the repair and maintenance of the car. Private space was easier to control, and while common areas were desirable, they had to be large enough to permit active play. The ensuing task force/design staff discourse avoided using process jargon and addressed the concepts not as abstractions but rather as means to utilize a site and interrelate dwelling activities.



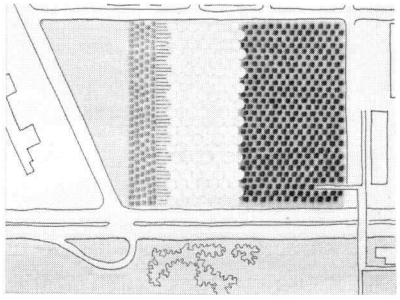
Capacity

An initial decision on the number of dwellings was engaged using a table representing the capacity equation. The table gave a range of alternatives reflecting the attitudes suggested previously. It provided comparative sets of options and consequences for apportioning the site (per dwelling); the average dwelling area used was 1,000 sq. ft.; building heights were arbitrary averages not exceeding walkup limits; vehicular access and storage areas were based on 1.2 cars per dwelling and an extensive road network (Q=1.9 to 1.5); and the open space areas were the consequence of the previous fixed inputs.

Ad/N	600	525	450	525	450	375	450	375	300	375	300	225
N	1.7	1.9	2.2	1.9	2.2	2.7	2.2	2.7	3.3	2.7	3.3	4.0
$\frac{AcQK}{A^V}$		700			650			600			550	
$\frac{Ad/N}{3}$	200	175	150	175	150	125	150	125	100	125	100	100
S.T.	1500	1400	1300	1350	1250	1150	1200	1100	1000	1050	950	875
P^o	200	250	300	150	200	250	100	150	200	75	125	175
R^o	450	500	550	250	300	350	200	250	300	125	175	200
Total	2150 sq. ft.				1750 sq. ft.			1500 sq. ft.			1250 sq. ft.	
D/acre	— 20				25			30			35	

The task force chose to maximize open space without exceeding a dwelling height of 3 stories. It rejected any alternative outside these limits and entertained the implications of developing from 250 to 300 dwellings on the site. A decision was reached after a total of 200 sq. ft; of open space was described and paced as a private yard 14 feet square for each house or as a total common area equivalent to 15 urban house lots (25x100ft.). Consideration of the programmed accessibility to the riverfront park was included in a tentative decision to attempt 300 dwellings, averaging not more than 2.7 stories in height.

(5) (4) (3) (1) (2)

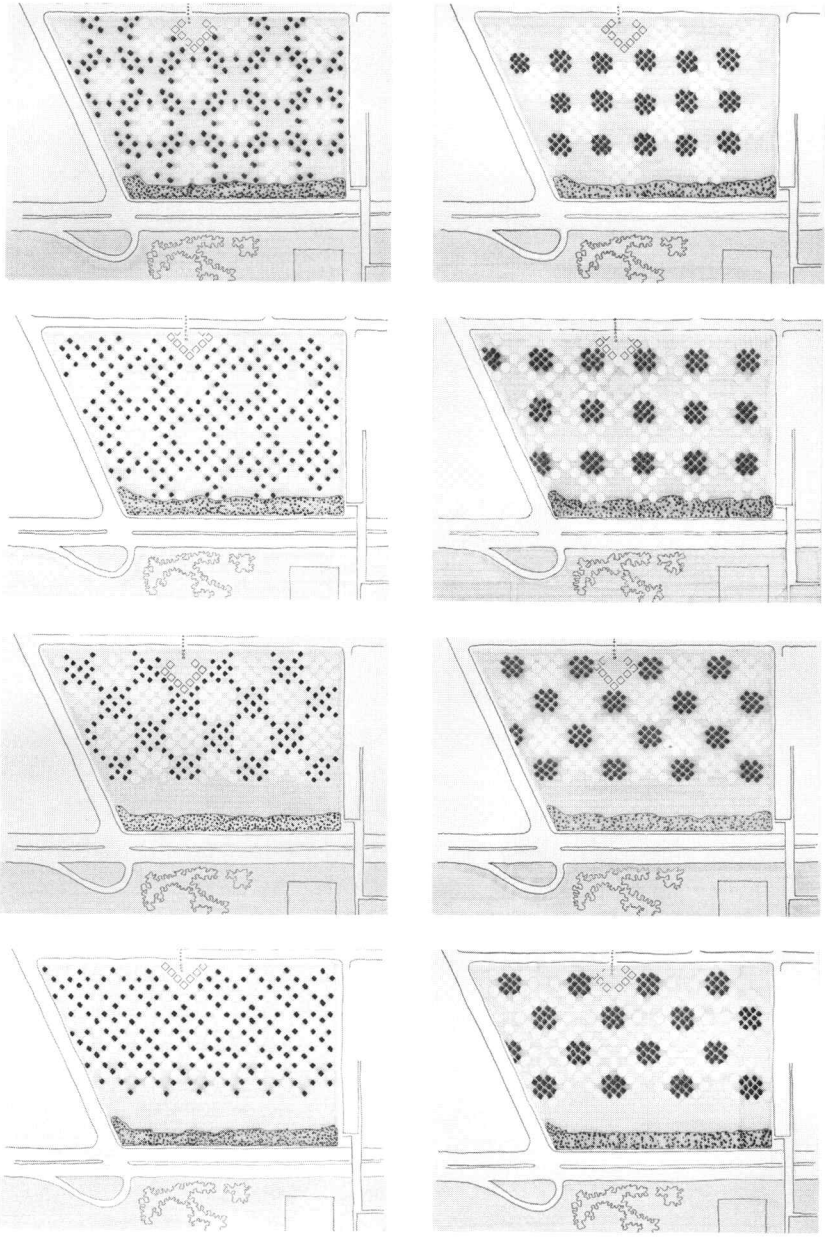


		sq. ft.	%
(1)	built land/dwelling,	375	25.0
	average building height	2.7	
(2)	vehicular access and storage	600	40.0
(3)	pedestrian access	125	8.3
(4)	private open space	150	10.0
(5)	common open space	250	16.7
	total land/dwelling	1500	100.0
	appr. dwellings/acre	30	

Distribution

The task force attached to dispersal the meaning of self-suffiency and private use of either parking or open space by each dwelling. Clustering was understood as sharing by a small group and concentration as a single place used by all the residents of a site. "Home ownership", an incrementing development and small supervised parking lots, reduced the number of distribution alternatives to 12 possibilities after dropping dwelling and vehicular concentration. The task force deleted 4 additional options by eliminating the dispersal of open space, because common recreation areas would not be provided. Consensus was also reached on every dwelling having some private open space, even if it meant trading common open space for it. Doubt by the design staff about dispersed vehicular storage within the tentative area assigned under capacity, was met with a demand for proof by the task force; reluctant to eliminate further alternatives without evidence, it insisted upon an investigation of the remaining 8 options. Parking was to be dispersed or clustered, dwellings could be either dispersed or clustered, and common open space was clustered and concentrated. Diagrams of alternatives included earlier design decisions relevant to the distribution issue - the riverfront park, the protective berm and the local convenience center. Concentrated open space was annexed to the berm along the arterial road, providing additional protection by distance and utilizing the interior slope for recreation. On the diagrams (to scale) each white dot represents 2 dwellings and each black dot 2 parking spaces (without a network); each alternative had 300 dwellings, averaging 2.7 stories in height, and 360 parking spaces.

The task force's reaction to the implications of distribution was unequivocal. The evident advantage of more open space with clustered dwellings was objected to as "casbah images" and apparent crowding. Explanations of open space efficiency were countered with objections to tight groupings which would form social cliques; a more continuous form of development, without insistent and obvious clustering, was desired. Although the diagrams did not indicate a road network, a consequence of



extensive paved surfaces with dispersed parking was evident; the task force also noted that dispersed parking and dwellings were maze-like in appearence. Clustering the open space, however, added a sense of orientation. Parking next to dwellings was considered very desirable, but its drawbacks reluctantly reduced the alternatives to 2, after the design staff assured that convenient distance from car to dwelling and car supervision could be achieved with clustered parking. Whether to cluster or concentrate common space became the single distribution issue to be decided. Because this decision was linked to how the site components would be interrelated, it was delayed until that phase of the design process was reached.

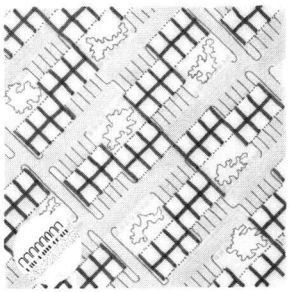
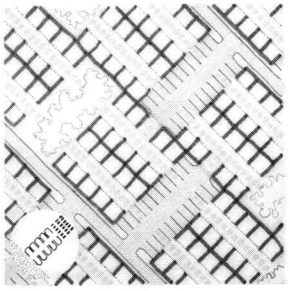
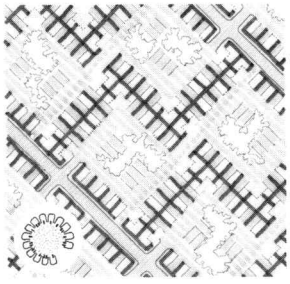
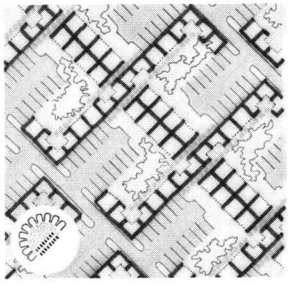
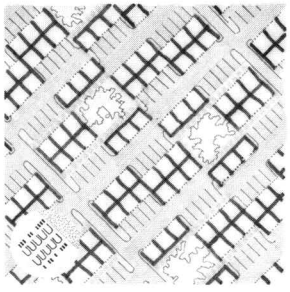
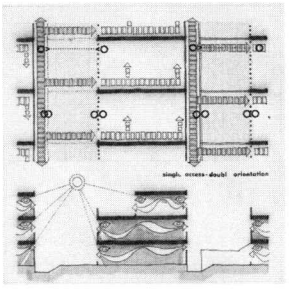
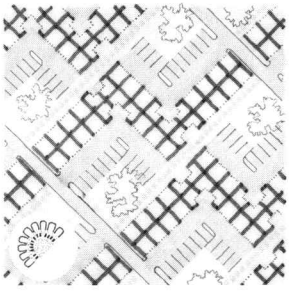
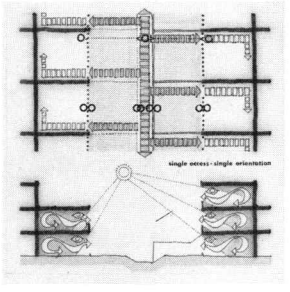
Overlap

Task force members interpreted coincidence as the lack of distinction between two or more activities in one area, like parking and playing. Intersection was understood as a condition where one activity spills into the area of another, such as the case of a "front stoop" and a sidewalk. An example of adjacency was represented by a street and a sidewalk and the relationship of street to backyard clearly communicated connection. Given the large number of alternatives, a systematic presentation and evaluation of proximities was not undertaken. Instead, casual discussion about the interrelationship of components proved adequate to indicate initial attitudes and preferences.

The car ideally provided a kind of "occasion space" for social gathering around the activity of maintenance and repair. If cars could not be next to dwelling, the task force decided 75 feet was an acceptable distance limit, as long as parking could be supervised from dwellings and frequently used paths. Discussion on open space revealed the most critical factors which influenced the structure of the site. Private open space associated with house was a place where one could meet the outside world and establish his identity. One could personalize a house by planting flowers and present one's image of achievement or status. Questions on where a house-

hold would gather with relative privacy to eat outdoors, prompted considerable amusement. Privacy outdoors was found under a tree in a park, not in the physical isolation of a backyard. Backyards permit thieves to break in, drug addicts to hide; in short, they compromise the safety of a house by inviting anti-social behavior. Private open space had to allow a toddler to play under supervision from the house. It was also a place where one could sit and converse with neighbors and greet passersby, unlike backyards which are away from where the action is! Common access, like a street, was considered an extension of dwelling, on which dwellers exert their control. Dwellings had to be oriented to the street, while being linked and buffered from it by a private open space, not intended to provide privacy, but private turf, for non-verbal communication and for casual social interaction; an enlarged stoop or front porch, was an analogy given. Preference for common open space, large enough for active play, suggested immediacy to dwellings was not essential, given parent's assurance of traffic safety; the task force also inferred vehicular/pedestrian separation in a request to give pedestrians priority without going to the extreme of grade separation.

These explicit preferences made it clear to the design staff that at least operational single orientation was essential to restrict access to one side. Despite traditional negative connotations, "back-to-back" houses provided a clear model. Single orientation would not limit daylight and ventilation standards. Dwellings could also gain access from one side and day-daylight and ventilation from two sides. Six dwelling aggregation alternatives were developed to fulfill the task force preferences. In 3 schemes, common open space and dwellings were connected or adjacent and the relationship of groups of dwellings correspond to a single dwelling; parking/dwelling overlap varied from connection to adjacency. In a second set of alternatives, open space and dwellings were either intersected or coincident, generating configurations greater than the sum of the parts; parking/dwelling overlap ranged from connection to intersection. The







single access - double orientation


single access - single orientation

latter alternatives were presented to verify dwelling/open space immediacy and confront the unresolved distribution issue.

Task force review of alternatives rejected a dwelling with a single access/double orientation. Overlooking someone else's place, without being able to exit from one's house to meet the person whose yard is being overlooked, was frustrating and unacceptable. Streets with houses on both sides had better surveillance and were more lively. The "back-to-back" house pattern was at first puzzling; few had ever seen a house on the ground without a back door. But the analogy of an apartment off a corridor, except with the entrance from the outside wall, resolved any doubts and the unconventional but acceptable solution was endorsed.

Aggregation alternatives were presented as only six of many possible combinations of dwellings, parking and open space. Although parking next to dwelling was thought to be ideal, convenient and easy to supervise, the task force disliked the idea of living around a parking lot. Task force members also realized that the distribution decision (whether to cluster or concentrate open space) was before them. Alternatives illustrating intersected and coincident dwelling/open space made this evident, and to the task force a decision clearly hinged around this issue. Within the task force opinions were split into 2 factions: the "cooperatists" believed open space had to be concentrated in order to be useful, and advocated small but supervised parking areas connected to dwellings. The "privatists" supported parking integrated with dwellings and the clustering of open space shared by smaller groups. The arguments centered on "home ownership", the value of the riverfront park and the need for smaller, more intimate playgrounds and sitting areas for toddlers and the elderly. "Cooperatists" argued that play areas for school-aged children could not be off the site; but their most convincing objections were aimed at the physical patterns which would result from open space clustering. The courts were characterized as ghetto-like compounds, like 'Catfish Row' or prisons, not com-

plementing the idea of "home ownership". A more continuous pattern, they argued, would not force people into groups and offer more openness and freedom. Concentrated open space, they believed, provided more opportunities and possibilities for common action. Small clusters of cars removed not more than 75 feet from dwellings offered greater safety, more pleasant surroundings, adequate supervision and only minimal inconvenience. The debate was amicably resolved by a vote favoring concentration of connected open space, clustering of parking connected to distributed dwellings and the intersection of pedestrian access with a single private open space.

Task force and design staff had thus arrived at an organization structure and utilization strategy for a development site, using a simple conceptual framework. Rational and systematic description of component elements enabled laymen and designers to establish a discourse. An explicit vocabulary for decision-making allowed dwellers to act in their own behalf and make informed judgments, and enabled designers to respond to the internal logic of authentic user and surrogate values and aspirations. The resulting program/design product provided a transmittable structural order or development framework which still had to be adapted to the specific site context, and in which built space the dwellings had to be infilled.

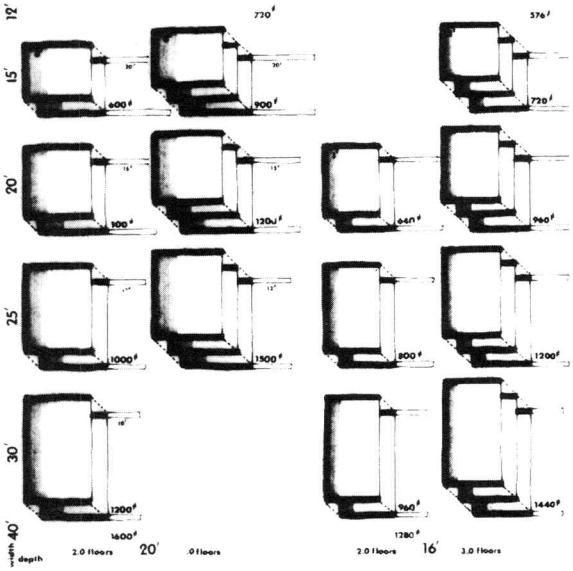
Dwelling Development

The initial criteria for the design of dwellings were given by the established program and site structure. Area requirements, distribution of dwelling sizes, economic constraints, and the desire for self-containment and eventual ownership had been defined by the logistical program. And building height, site coverage, and the interrelationship of a single-access, single orientation dwelling connected by a private open space to a pedestrian network were furnished by the overlap distribution and site capacity agenda.

An examination of single orientation dwellings, given daylight and ventilation norms and using a maximum building depth not exceeding 20

feet illustrated for the task force the dimensional implications. To avoid shallow and wide front yards, larger household dwellings had to be accommodated in three-story buildings. Even so, the area previously allocated to open space would be entirely consumed without space left for shared or common land. Since these disadvantages of a wide house front-including an increase in the distance from dwelling to parking-were unacceptable to the task force, the design staff was instructed to try again; more specifically, seek a solution equally fair to all dwellings, which also avoided a three-story house. This led todeveloping an alternative in which the line of building was wrapped around two sides of the private yard - a "courthouse". All dwellings would thus be included in a building envelope which could vary in depth according to household size, but not exceed two stories. When the alternative was presented to the task force, it was pointed out that the wall perimeter was more extensive, a disadvantage which could be offset by the sharing of walls and the opportunity for vertical stacking made possible in the sloping site.

Probably because of its novelty, the task force was attracted to the courthouse. But the new standard of two-story dwellings which contradicted the earlier site capacity choice required a trade-off: less open space, less dwellings or a new distribution. The task force insisted that houses for home-ownership, higher than two stories, were too unconventional: however, three-story apartments were acceptable. Thus a design staff proposal to designate 25% or 75 dwellings "apartments" in three-story buildings, while maintaining the initial average building height of 2.7 stories, was accepted by the task force. The compromise, however, included such preconditions as: apartments only for half of the smaller households, elderly and young couples, to be located in areas where there would be more "action". The design staff suggestion to make a line of apartments along the access street of the site was initially endorsed. Having defined the dwelling cell, its clustering structure and a utilization strategy for the development site, then made possible a first synthesis adapted to the specific site context.



three story dwelling



two story dwelling

First Synthesis and Development

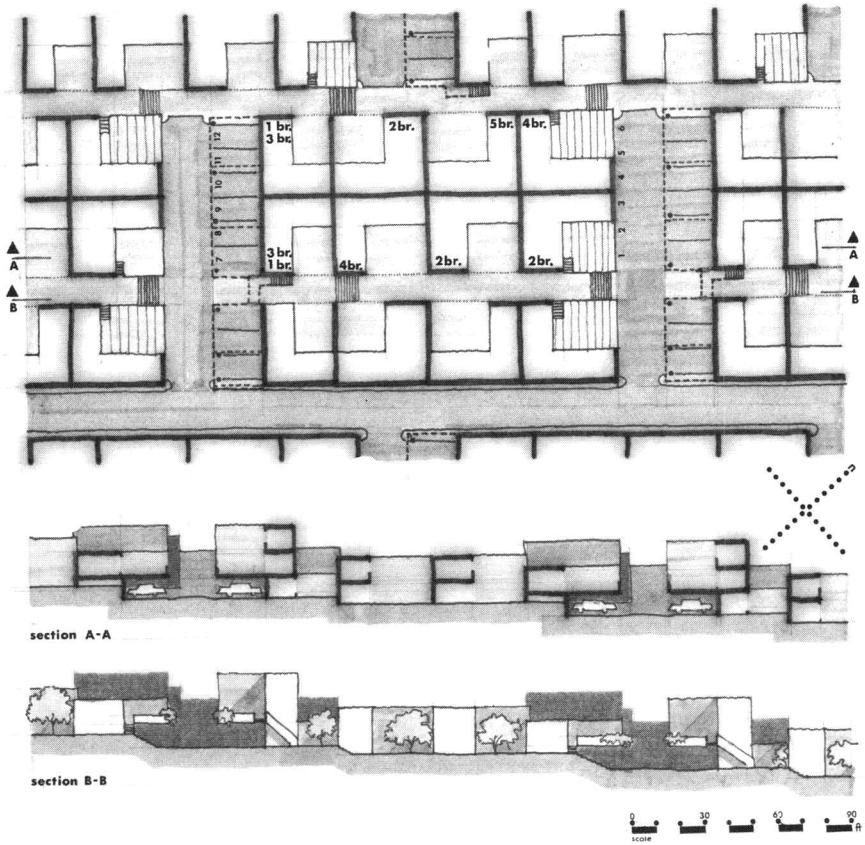
The initial proposal was a literal graphic translation of the program and development structure adapted to the site. It provided a physical architectural product to which the surrogate task force could react. Dwellings, parking areas and the pedestrian and vehicular networks were woven into separate but intersecting lattice grids which fulfilled all the capacity, distribution and overlap criteria. Dwelling aggregation took advantage of the site slope and were superimposed over vehicular storage, thus reducing the distance from house to car and the exposed paved area. The dwellings were accommodated in a constant depth parcel and two parcel widths. It was a first tangible composite product intended to verify previous choices, activate discussion and evaluation, and continue to evolve additional and more detailed programmatic requirements. In this sense it became both a physical framework to be altered in subsequent meetings and an agenda similar to the one which had assisted its evolution.

Site Structure

The immediate reaction to the proposal was favorable; the task force liked how the private house met the public paths using the courtyard which residents could personalize; they expressed satisfaction with the idea of focusing all activity on the paths, with "the way we like to live". Similar favor was given to the links to the surrounding context, the single large open space and the parking solution; in particular, the task force was pleased with their compromise which minimized the distance from house to car, separated vehicles from pedestrians, achieved adequate surveillance and afforded the weather protection of "carports".

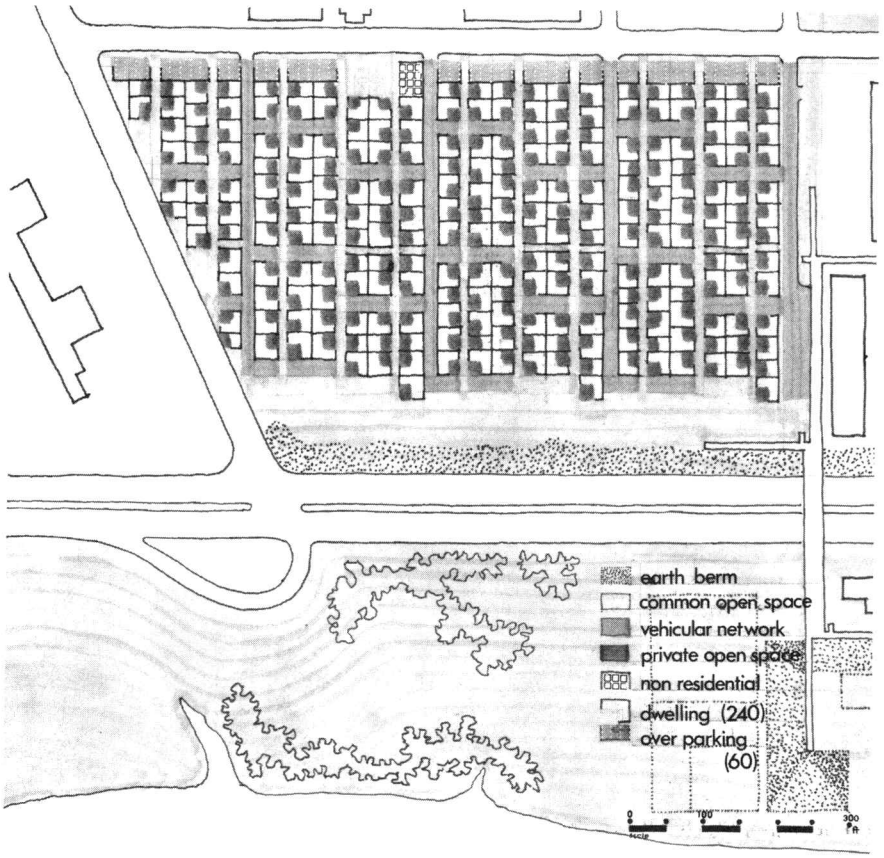
Serious doubts, however, were raised over the programmed parking ration. (1.2). Many participants had two cars since more than one adult worked and public transportation was inadequate or not available. To one participant it was senseless to build new houses which would force people to park in the street, thus negating all the effort spent in having supervision. Unwilling to reduce open space or increase building height, the task force had to consider reducing the number of dwellings. After the design staff

estimated that for every dwelling deleted one parking space that could be added, the task force settled on a new parking ratio of 1.5 for no fewer than 260 dwellings.



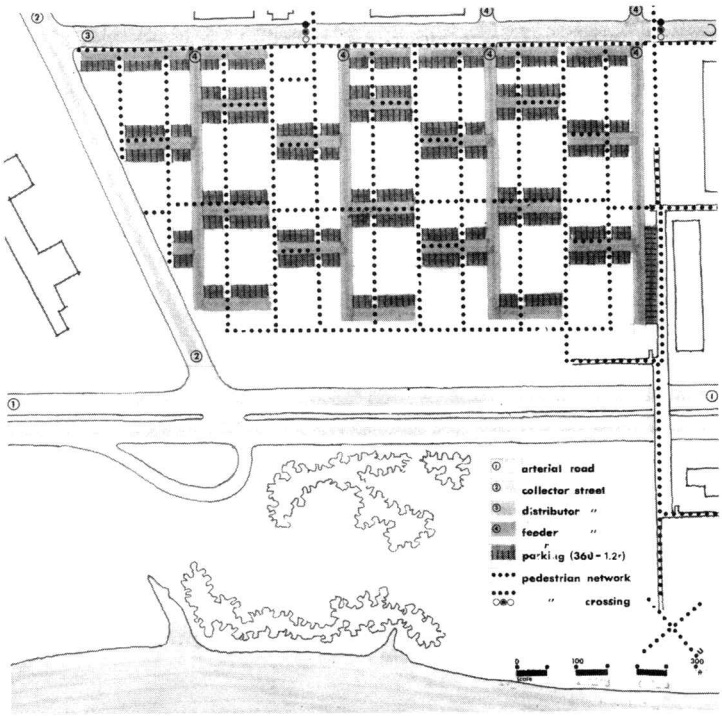
A second concern was directed at the access roads in the site. They were considered too straight, too long and inviting to speeders. Proposals to reduce traffic speed and monotony included the building of "bumps" on the roads or introducing "bends". The latter was adopted by the task

force because it also resolved the apparent length. When an illustrative diagram was presented, one participant noticed the open areas formed where the roads were offset; he suggested they be developed as sitting areas and that more could be provided. Two supporting elderly participants suggested they would be good places to sit and play checkers, while watching both cars and people go by. General approval also included the criterion of clustering smaller dwellings (more likely for elderly residents)at the pedestrian/vehicular intersections.



Dwelling Cluster

Discussions at this scale of the proposal were focused on outdoor storage garbage removal and the drying of laundry outdoors. For refuse and garbage removal, two alternatives were adaptable to the site structure since municipal service could not be provided to each house.Collection points could be made available at each parking area or a project maintenance staff could collect from normal household containers at each house, at regular intervals. The second option would incur an operating cost but collective containers were always messy. The most convincing argument offered, questioned the logic of scattering sizable garbage points, a nuisance, instead of individual house storage units and a central collection point used by maintenance staff. When consultation with the funding advisor indicated the extra cost would not create a burden, the issue became how and where to store the individual containers.



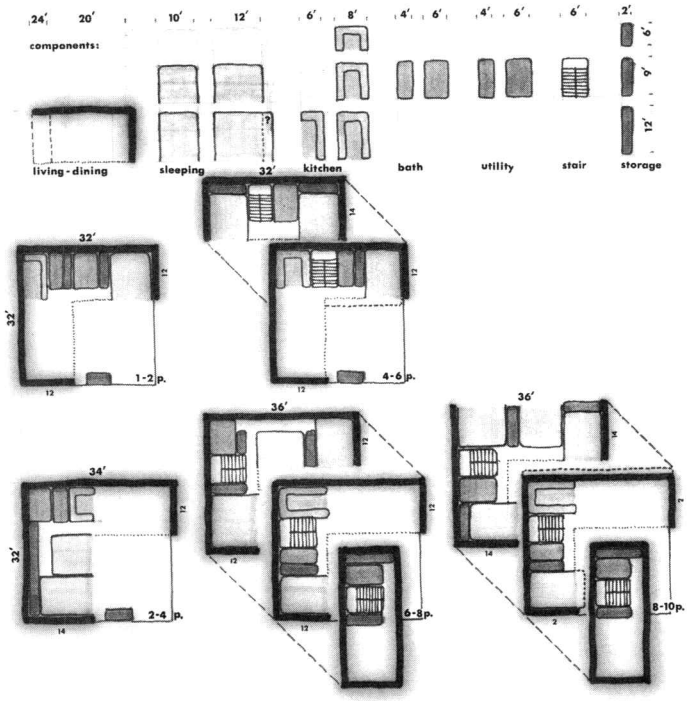
A garden shed for both the storing of garbage cans, and for garden tools, outdoor furniture and play equipment was an evident answer. While examining alternative locations, task force members also raised the need of defining the turf between courtyard and path on the ground; the terraces above the parking were adequate. The suggestion by some to build fences to keep out strangers was countered by the elimination of surveillance over the path, if fences were too high. Both the shed location and court definition were resolved by a design staff suggestion eventually adopted: raise the level of the court a few feet and allow each resident to locate the shed at any point along the public boundary.

Where to dry laundry outdoors generated some of the most heated arguments, particularly between young and middle-aged women. Young women objected to using the private front yards, since it would give the area the appearance of a slum. Permanent laundry lines would clutter the polite and only side of dwelling. The opposition dismissed the argument as pretentious, claiming that those ashamed to use their yards should go to the laundromat. A suggestion to introduce shared drying yards was considered acceptable, but only if the proponent took the job of official laundry guard to prevent theft. A vote finally defeated the provision of shared laundry yards and accepted leaving the choice on whether to use front yards to each resident.

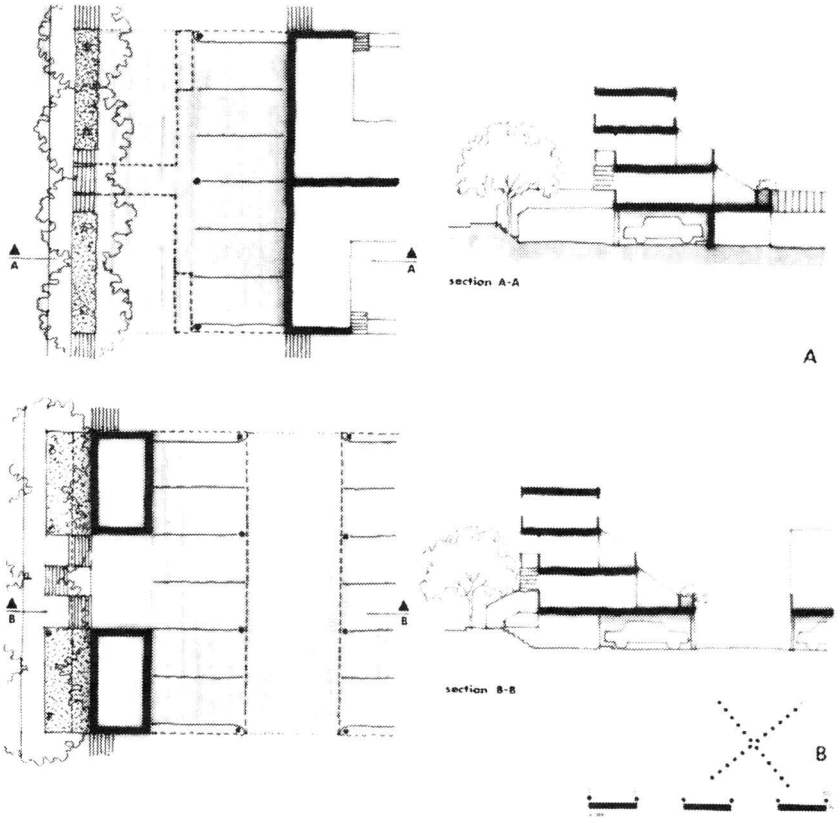
Dwelling Cell

Although the courtyard house had been approved in principle, much remained to be established about preferred life patterns within the dwelling. Initial normal inquiries about how living space was used or attempts to gather clues about attitudes on household privacy or visitor's ritual, yielded very few guidelines. The design staff therefore approached the definition of dwelling as a series of trade-offs within the previously established area limits. Alternative sizes and locations and number of occupants in bedrooms were coupled to consequences in living, dining, and kitchen spaces. Similar trades were formulated with storage, bath, entrance and circulation, and within the sleeping and living areas.

Some of the salient criteria screened from this procedure, although by no means complete, furnished a reasonable profile of held values. Requirements for entrance to house included access to various parts while being able to avoid other members of the household. This was particularly applicable in extended households which included adult relatives. Preference was indicated for one bedroom, separate from the household area and with some independence for either a relative or teenager. Although a few task force members expressed the desire for large kitchens and minimal "formal living areas", a dominant faction suggested that living space should be flexible (meaning not subdivided) while kitchen was only ancillary. Lastly concern was expressed over the need for additional living space, such as a basement playroom in the largest 8 or 10 person households.



With these requirements the design staff developed a set of dwellings using a family of similar components. All dwelling sizes were fitted within the confines of the land parcels; 8-10 person dwellings, however, to reduce internal circulation, had to gain daylight and ventilation from the back wall. When the schemes were presented with an explanation of the large dwelling exception, the task force noticed that both the driveways and site perimeter had no openings. This would make canyons in the driveways and windowless buildings on the site edge would be unfriendly. Windows told that people lived there and avoided the "prison look". The house plans, if windows faced driveways, were approved without further questions.



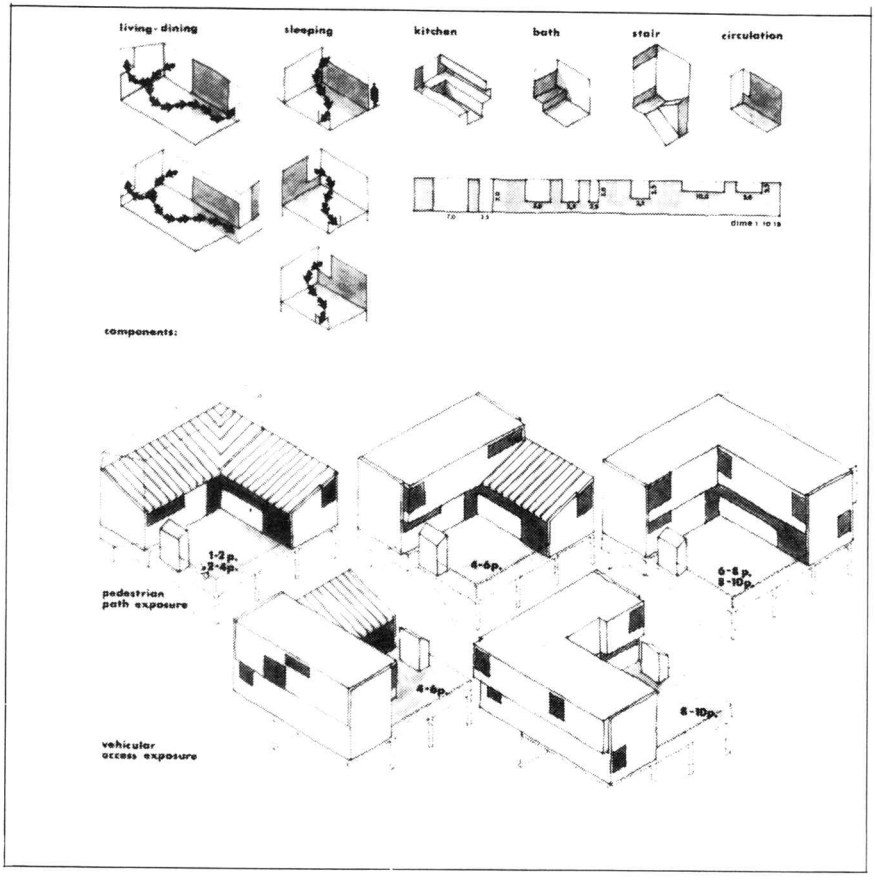
More schematic proposals to use similar dwelling plans as apartments were also developed. By using the site, slope dwellings could be stacked and maintain the courtyards without having to climb more than 1 1/2 stories. The alternatives illustrated parking options which gained access from either a service driveway adjacent to the street or within the site. Access to dwellings in both alternatives, however, had to be from the public street. The task force reaction was surprising. The driveway adjacent to the street was seen as an obstacle which would make the project front a parking lot. In both schemes residents had no reason to ever enter the site. The dwellings that happen within the site should be seen from the outside and not hidden by a wall of buildings! The design staff was chided for having the tendency to want to build walls (prison) everywhere. But even after being reminded that extending the site pattern to the edge would reduce the total number of dwellings to about 240, the task force remained adamant and instructed the design staff to do so.

Building Fabric

Design staff efforts to elicit task force preferences for form and appearance attributes of house proved again futile without a vocabulary to activate discussion and selection. Most comments remained at the level of buildings should look like houses or materials should be those associated with a presentable house until more explicit criteria based on more tangible information were used. Three issues introduced by the design staff, roofs, fenestration and surfaces, managed to engage the values of the task force.

Although houses were supposed to have sloped roofs and flat roofs were acceptable for apartments, further discussion revealed that objections to flat roofs were centered on being able to see them from above. A suggestion to slope all visible roofs in the one story segments of dwellings, while the second story received flat roofs was acceptable. Similarly, fenestration was discussed around concepts of security and privacy as well as the lo-

cation of openings with regard to daylight and venelation. "Windows" as perforations in a wall were preferred over deletion of the wall, particularly in bedrooms; on the ground floor, openings were to be high except in the living room where a "sliding-glass door" would be desirable. When asked to select the location of openings within a room, those options which washed adjacent walls with light and avoided high contrasts while enabling cross ventilation were chosen. One participant also deduced that windows in corners would leave more wall space to place furniture against.



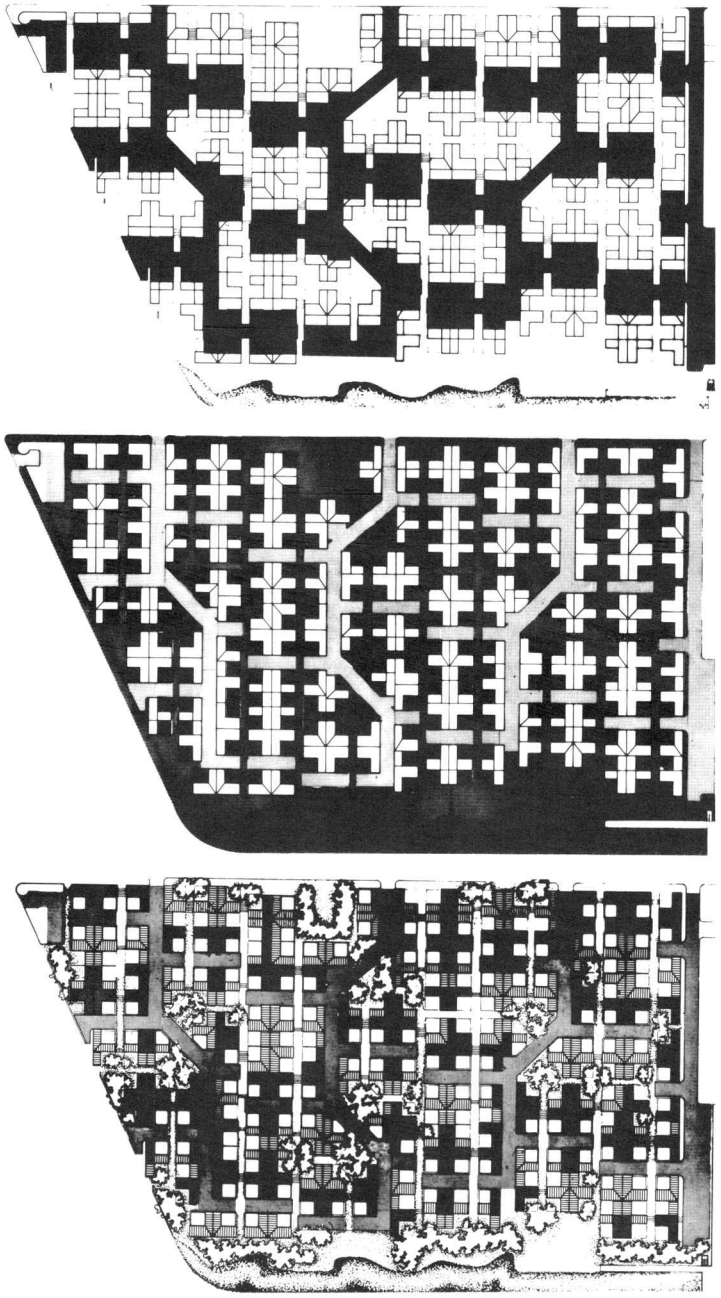
The choice of surfaces was preconditioned by fire and acoustic separation; the outer shell had to be masonry. The inner courtyard walls and what type of masonry, however, were open to task force decisions. Masonry to the task force had to be maintenance-free and even though it would be less expensive, concrete block or similar materials associated with warehouses and outbuildings had to be avoided. Although changes in the color were considered, one participant suggested that five dwelling types could be distributed throughout the site so that no two adjacent dwellings would have to be similar. This suggestion was followed by a proposal to maintain uniformity in the visible roofs and encourage variety in the finish of interior courtyard walls using either painted or natural finish applied sidings.

Developed Proposal

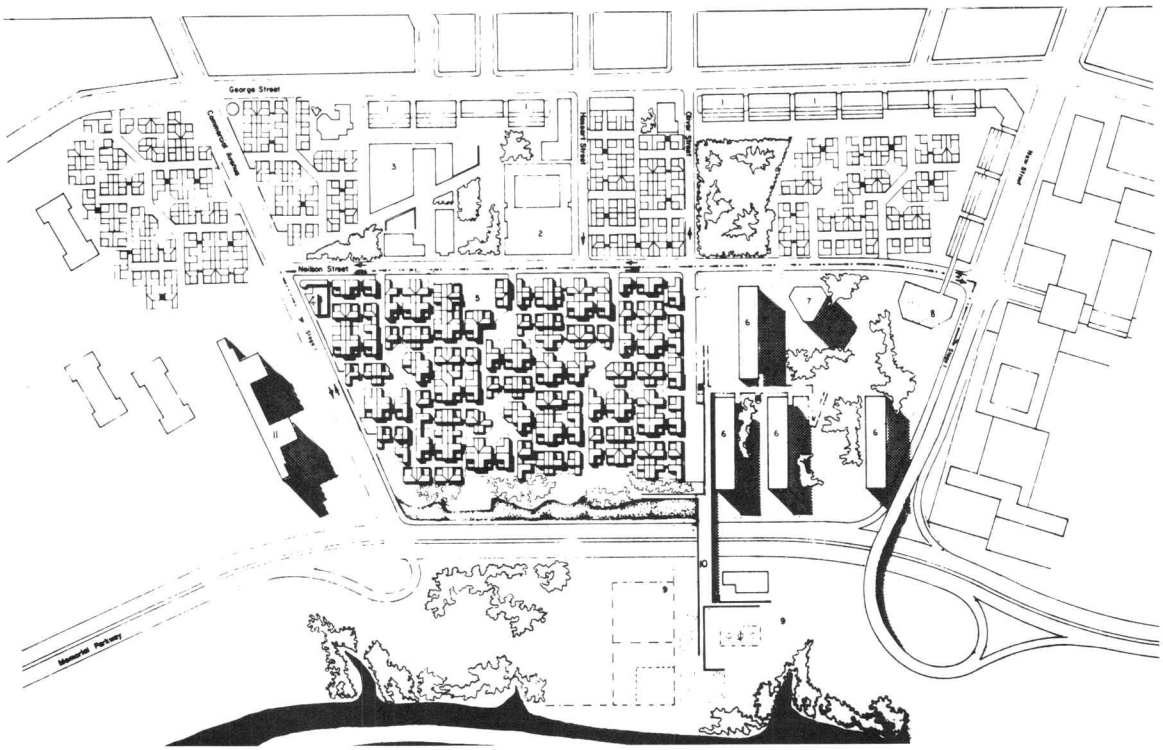
User and surrogate participation as a means to design inception, and argumentation as a means to make explicit and raising doubt [6] had been used throughout the entire design development. A physical proposal had evolved from user values about the context, the site structure, the dwelling cluster, the dwelling cell and the building fabric. And the design process and evolving product had withstood major programmatic modifications including the reconsideration of the parking ratio, the area of dwellings, the initially established building height and eventually the total number of buildings on the site.

The developed proposal ultimately accommodated 240 dwellings, averaging 1.7 stories at a density of 25 dwellings (130 bed-spaces) per acre. The allocation of land per dwelling was in excess of 2,050 sq. ft. (dwelling 600 sq. ft.; parking 1.5 ratio - 650 sq. ft.; private open space 350 sq. ft.: and common open space 300 sq. ft.).[7] The average dwelling area ex-

6. H. Rittel et al. "Son of Rittelthink". The DMG 5th Anniversary Report, DMG Occasional Paper No. 1, Jan. 1972, pp. 5-10.
7. For comparison see initial capacity table.



ceeded 1,00 sq. ft.; and the superpostion of dwellings and private open space over vehicular storage, increased the capacity, maintained the relationships and enhanced the site's development.



Legend
1. commercial/residential
2. existing elementary school and addition
3. new health and day care center

4. maintenance building
5. local commercial
6. existing public housing
7. existing elderly housing
8. proposed multi service center
9. proposed recreation center
10. proposed pedestrian bridge
11. existing middle income housing

Implications

To the task force, the design product was a reward for the long hours of work and diligent involvement; it offered a sense of pride and accomplishment and was appropriated as a symbolic realization of values and aspirations for a place to dwell. A taxonomy of site components examined by an argumentative process based on physical properties - capacity, distribution and overlap - had provided users and surrogates a means to state, express, reaffirm and select physical confirmations of life patterns and cultural values.

To the design staff, the process offered a systematic means to generate, develop and communicate alternative organizations and explicit choices, none of which were necessarily more correct than others. Size aggregation and contingency options, as the activating medium for participation, offered a better likelihood of finding congruence. Informed participation, however, did not guarantee fitness; it only approached more closely, responsive places to dwell, then preconceived and proscribed answers, by insisting on user and surrogate autonomy over priorities and trade-offs and providing at least the satisfaction of making individual and collective judgments.

PARTICIPATION IN SCHOOL PLANNING: A PROPOSED GAME

Michael Pyatok

I. Adamson, R. Choley, C. Coelos, R. Duncan,
L. Epstein, J. Fiske, W. Greenfield, B. Jackson,
D. Ketner, D. Kramer, B. Osen, C. Pettibon,
M. Pyatok, S. Somogy

The above are students of architecture at Penn State University who developed the following game for a one credit Design Methods course. Mr. Pyatok was their instructor.

Michael Pyatok is a graduate of Pratt Institute (1966) and Harvard's Graduate School of Design. After working for a number of offices in New York and Baltimore, he taught for four years in the Department of Architecture at the Pennsylvania State University with a one year stay abroad in Helsinki, Finland as a Fulbright Fellow. While at Penn State he engaged in some post-graduate studies in Ray Studer's Department of Man-Environment Relations. He has recently joined the faculty in the School of Architecture at Washington University, St. Louis.

As opposed to the history of other disciplines, Mr. Pyatok believes that the growth of theory and method in environmental design today must be demystified to include the layman in every aspect. Historically, professionalism was needed because the public was ignorant, but today the public is kept ignorant because of professionalism. To him, the act of contribution by laymen can become an educational, recreational, spiritual, life expanding experience for them—so much so that the original intentions of producing hardware products in any design process can become secondary to the act of contribution itself. The increased time required to contemplate the issues in a truly democratic manner and the expanded consciousness which results from the dialogue could lead people to retard the frenzied building process and the consequent exploitation of nature. Mr. Pyatok believes that the methods designers develop can help the layman realize that the conditioned, excessive consumption of products on all scales, including architecture, has become an opiate to disguise the absence of the single most needed ingredient in the affluent society: a synergistic collaboration in the contribution to the society's future development.

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PARTICIPATION IN SCHOOL PLANNING: A PROPOSED GAME

Education — Growth Through Argument

Pedagogical theory has been and will be a continuous debate. For the task of raising new members of our society seeks two contradictory goals. On the one hand, conformity to tested behavior patterns of the ongoing culture is sought. On the other hand, flexibility to adapt and invent is considered essential. Each era's debate about how to balance properly these two demands seems to center on two main normative issues: The first concerns the problem of ends or objectives, that is, where should man be going, entailing a theory of who man is, and why he is here. The second normative issue concerns the problem of means, or courses of action, that is, how should man attempt to fulfill the objectives spawned by the ongoing beliefs, such that these means reflect the beliefs and, in so doing, fulfill their prophecy. As in any debate, a spectrum of beliefs emerges about objectives and courses of action, from a conservative, preservationist attitude, emphasizing the demand for conformity, to a radical reconstructivist attitude, emphasizing the demand for change and adaptation. In many school districts of America today, this debate continues and even flares to incendiary confrontation, no longer between educators alone, but either between various user groups of the educational system or between users and managers. Those who have and have not benefited from the existing system of education tend to drift further to the extremes of the spectrum, placing it under intense stress. The question therefore arises, can the present educational organizations survive their internal and external contradictions?[1]

The design and management of educational systems and their facil-

ities in this century has reflected the general trends of organizational design of the industrial age: the gradual development of specialization to carry on a growing number of tasks; a strict hierarchy that painfully coerces integration of these specialties; centralization of control to insure predictability; a clearly defined boundary between those trained to be within the system and those without, establishing relative independence of the organization from environmental influences. For a number of reasons, as Emery points out, [2] organizations of this type are under pressure to change due to fundamental changes that have taken place in their environment in this century. Educational organizations are no exception. According to his view, our society today is characterized as a turbulent field, consisting of dynamic processes arising from the field itself, not just from the interaction between organizations, and is the result of four major trends: a) the linkage of sets of organizations achieving sizes which induce processes in the environment not foreseen; b) increased interpendence of organizations and their social and political fields, which are highly unpredictable; c) increases in research and development making organizations even more sensitive to changes in their environment; d) increases in speed and scope of communication, reducing response time to perceived information and causing reaction before action. The centralized, pyramidal forms of organization of the industrial era, including our educational systems, are not capable of adapting to such complexity.

1. Hutchins, Robert. The Learning Society, New York, New American Library, 1969. Hutchins argues that education today still sees itself as a means, a course of action directed toward the goal of eventual work; his view sees education in a leisure society as an end in itself, life long.

2. Emery, Fred. E. "Concepts, Methods and Anticipations," from Forecasting and the Social Sciences, edited by Michael Young, Heinemann Educational Books, London, 1968.

In many ways, the educational system, being public, has always been highly susceptible to outside influence. But its recent interpretation as a purposeful social reformer, [3] its ineffectual entanglement in bureaucracy leading to pessimistic projections, [4] the ease of monitoring its development and informing the public, all contribute to pressures to alter its management and evaluation strategies. The overwhelmingly popular proposal for adapting complex organizations to the turbulence of the post-industrial era is captured in the following statements:

"distribute to a larger and larger proportion of the population responsibility for the decisions that shape the future"; [5]

"wherever centralized planning begins to narrow the ability of individuals to express themselves in certain traditional ways, then the system has become less effective and the system scientist should translate the lack of freedom in the system into a deterioration of the system effectiveness"; [6]

3. for school as a social reformer: Brameld, Theodore. Toward a Reconstructed Philosophy of Education, The Dryden Press, Inc., New York, 1956.
   against school as a social reformer: Lasch, Christopher. "Inequality and Education", The New York Review of Books, Vol. 20, No. 8, May 17, 1973.

4. Illich, Ivan. Deschooling Society, Harper & Row, New York, 1971.

5. Illich, Ivan. "The Road to 1977", Fortune, Jan. 1967.

"turbulent fields require some over-all form of organization quite different to the hierarchically structured forms to which we are accustomed". [7]

In the case of the design of educational systems and their facilities, strategies for making their preparation and operation more adaptive to external and internal pressures in a manner that captures the essence of the above statements, might include the following characteristics:

Decision bodies with a broadened membership to include a variety of perspectives of what the system ought to be;

Professional opinions placed in an appropriate position regarding the normative issues - educator, advisor, not director;

Improvement of the flow of information through all phases of the program's life to all interested users;

Operation of programs simultaneously within one organization from several points of view with the intention of experiment and comparison;

6. Churchman, C.W. "On the Ethics of Large-scale Systems", 1966, V.C. Berkeley, Space Sciences Laboratory, Paper 37.

7. Emery, Fred. Ibid.

Institution of an ongoing, comparative evaluation from several points of view of the programs in operation;

Hardware easily adaptable and responsive to proposed changes in the educational programs by users.

Planning Educational Facilities

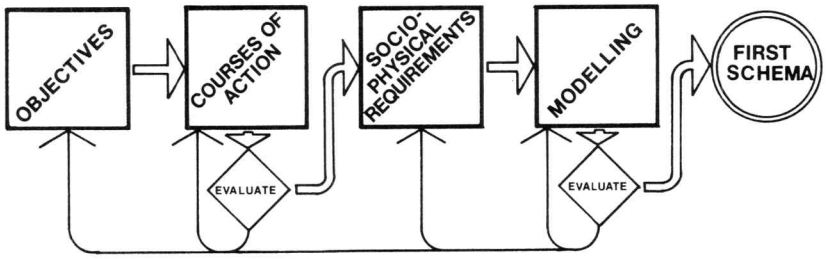
The following is an interim report on the development of such a strategy for the programming and design of an educational facility more responsive to environmental influences. Its purpose would be two-fold, depending upon the local political situation: 1) to bring together in a systematic decision process several opposing views among users, managers, and operators to arrive at a consensus solution within a brief period, thereby saving time and money, or 2) to educate users, managers and operators about each others' point of view, but leaving decision-making in the hands of the present managers.

Because conflict of views is a basic ingredient in the evolution of educational doctrine, not only on a district wide basis but within a single organization, the views of various groups interested in the direction of the educational program must be assembled to seek appropriate resolution. While using a democratic process, these groups may still seek resolution in three ways: 1) they could compete for control of the limited resources, with the most powerful view taking control; 2) they could accept the variety and seek to implement simultaneously several approaches in a spirit of comparative testing; 3) they could utilize a compromise-generating approach and seek a single eclectic solution. The conflict stirred while seeking the resolution seems an appropriate

8. Mann, Thorbjorn. "Play IBIS, a Design Game Based on the Argumentative Model of Design", DMG-DRS Journal, Vol. 6, No. 4, Oct-Dec. 1972.

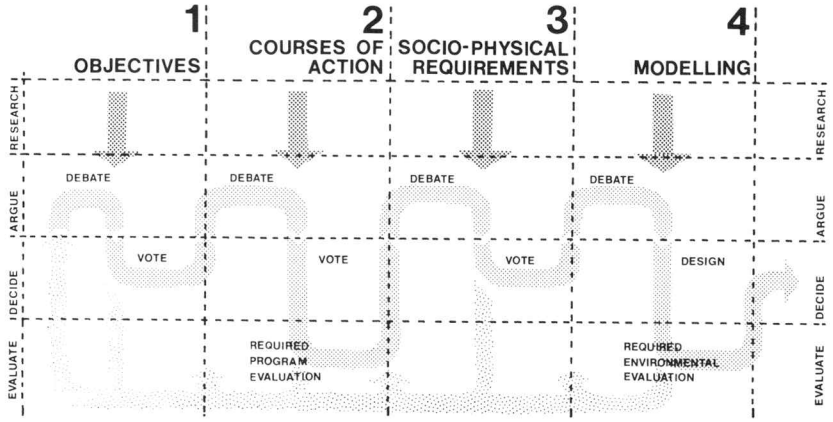
condition for using a planning game. [8] A game that would allow any of the three situations to emerge might be characterized by the simplified flow of Steps in Figure 1. The character of each local group that uses the game would determine, through playing, which of three ways of resolving the conflict is natural to them.

Figure 1



For each step, there exists a potential conflict of interest among the users, managers, or operators (administrators, teachers, students, parents, community groups, etc.). For that conflict to be clear and focused on the appropriate issues before decisions are made, advice of experts and researchers is necessary. Decision-making requires organized argument prior to it and the decision making through some balloting procedure must reflect the multiplicity of values present among the user groups. Periodically during the flow, evaluation of progress must be made; evaluation of the 'product' as it emerges (program and facility) and evaluation of the strategy or game itself as it progresses. Hence, each major Step may involve one or more of the following Routines: 1) presentation of information by researchers; 2) argumentation over the information; 3) vote to decide; 4) evaluate outcome, backtracking to a previous step to correct the course of the solution. A more refined diagram of the flow would be as in Figure 2.

Figure 2



Assembling the Decision Group

Each school district would have its own unique conditions leading to the necessity for a participatory approach. Either the School Board recognizes the need for a new school or a group from the local community does. Whatever the reasons for the initiation of such a project, (to distribute power, to educate the public, or simply stir up community interest and therefore support) appropriate and representative members must be chosen to be players in the game. After pre-game publicity (newspapers, radio announcements, mobile public address systems), the people who initially turn out must be grouped into roles. People may choose to play their own roles, or others', depending on the goals of the game. If too many appear for the game, names can be chosen by lot from each interest group, or selected by their representative interest groups.

Since the members of the Decision Group may come from many walks of life, some having little knowledge about the decisions before them and perhaps insecure for that reason, their initiation into the Group becomes a sensitive issue. Since the last portion of the game (Step 4) involves designing the facilities through use of models, an enjoyable experience, the opening session can present the group with all decisions of Step1,

2, and 3 completed, requiring them to begin immediately in modelling. This would serve not only as a social catalyst for meeting each other, and beginning to understand each other's way of operating and dealing with people, but would also provide the Group with knowledge of how the whole game works, its terminology, etc. This opening session then would purposely avoid the confrontation that may occur in Steps 1, 2, and 3, the formulation of the educational program and environmental quality.

Choosing Objectives

The ultimate goal of such a game (whether used as a learning experience only, or to make actual decisions) would be to design a school - its operations and facilities - within a budget acceptable to the taxpayers. This may require trade-offs in any step along the flow and, therefore, requires the establishment of priorities. For when cost over-runs occur, the Decision Group must backtrack and either eliminate or trade-off. To be democratic, the basis for such priorities must be founded on the consensus of the group. These priorities would be established for Steps 1 and 2 in the following manner.

The Issues for which the Decision Group must generate Objectives will vary from project to project. However, the following is a tentative list of critical Issues common to all educational programs to which a Decision Group would need to address itself: internal control, curriculum format, community involvement, teaching technique, attitude toward child, sequence, student grouping. To facilitate the generation of an Objective for each Issue in the first iteration, a packaged list of five alternative Objectives is presented by the game operator for each Issue, ranging on a spectrum from a conservative position to a radical position. Educational Researchers briefly explain the different opinions existing for an Issue. All members of the Decision-Group after argumentation, rank the alternative Objectives. These rankings are multiplied by a power factor for each decision maker. Power factors for each interest group vary from Step to Step (and from Issue to Issue in Step 1), depending upon the

expected competency of the various interest groups for the decisions in each step. The game operator will assign the power factors for the first iteration, subject to change by the participants if they consider the distribution unfair after witnessing its impact. For example, in the first round, regarding the Community Involvement Issue, the power factor of the community representatives may be 5 versus 3 for representatives of the Board of Education. On the other hand, the Board representatives may receive a power factor of 5 for the Internal Control Issue. If the Decision Group so desired, all power factors can be equal at the start, and in later iterations introduce imbalances as the players recognized their strengths and weaknesses.

Choosing Courses of Action

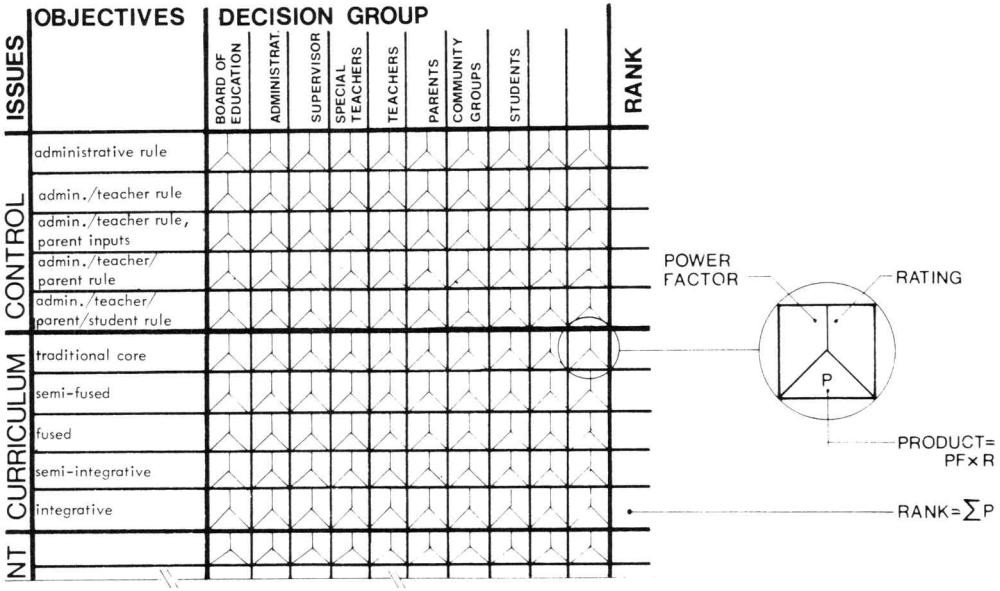
A Course of Action is a statement describing human activity organized to meet an Objective. Some of the Objectives (curriculum content, community involvement, student grouping, teaching techniques) generate such operations. These descriptions would outline the major departments or subsystems in the organization as well as major events within them. Some Courses of Action simply express a general attitude (control, attitude toward child, sequence, teacher/student relationship) and qualify the social milieu of the school's operations. These descriptions become important later in the game, for choosing the proper environment for the school's operations requires an explicit depiction of the human system.

Once a consensus Objective is tentatively obtained for each Issue, the game operator then provides the Decision Group with a list of five Courses of Action per chosen Objective, again to speed up the first pass through the game.

Educational Researchers will have generated these prepackaged Courses of Action, ranging again from a somewhat conservative position to a radical position, without losing the essence of the already chosen Objective.

This choice will allow those who lost out in choosing an Objective, at least an opportunity to coerce the direction of the Courses of Action somewhat to their liking. The operating costs of these Courses of Action are also included to assist in making choices. The Educational Researchers present to the Decision Group pro and con arguments for the Courses of Action. The Decision Group then discusses and argues about the relative worth of various Courses of Action for their chosen Objectives. After debate, the role players representing the interest groups cast their votes, which are multiplied by power factors and added to form a consensus view. (Fig. 4).

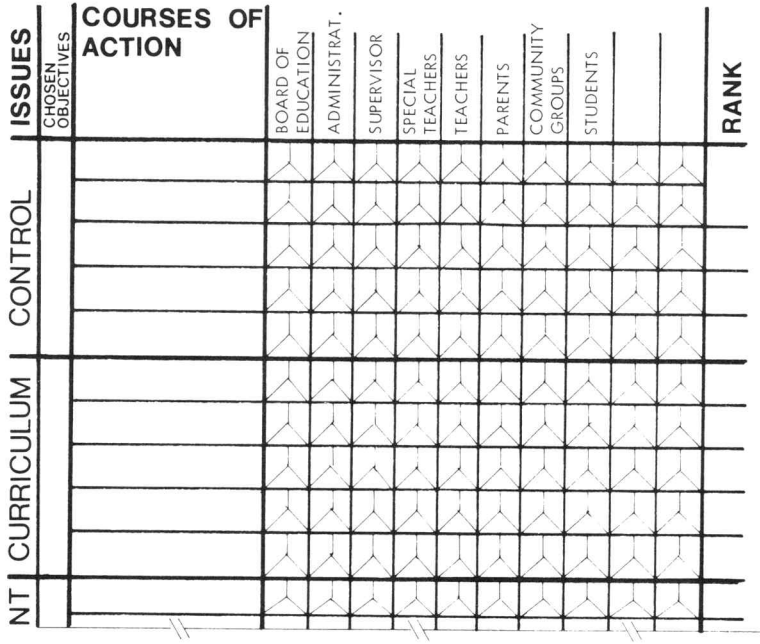
Figure 3



Priorities

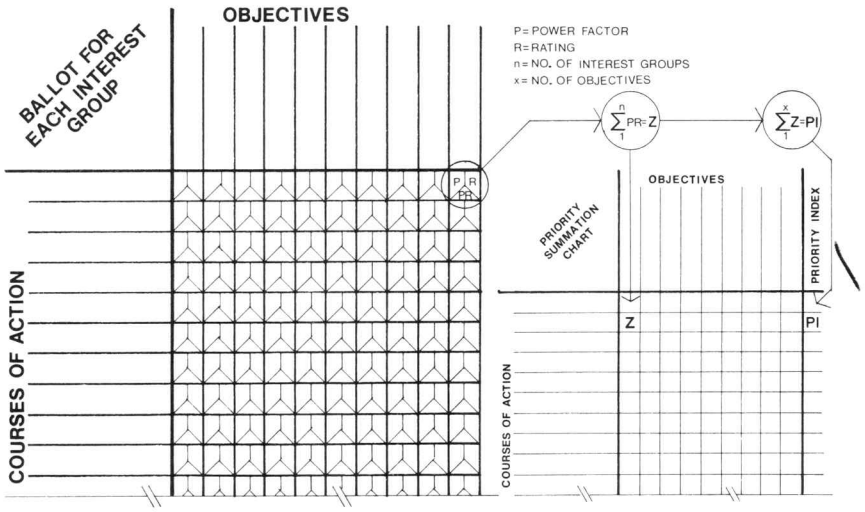
The Decision Group has now a sense of what it wishes to accomplish and how. Because of limited resourses, it must establish priorities, for

Figure 4



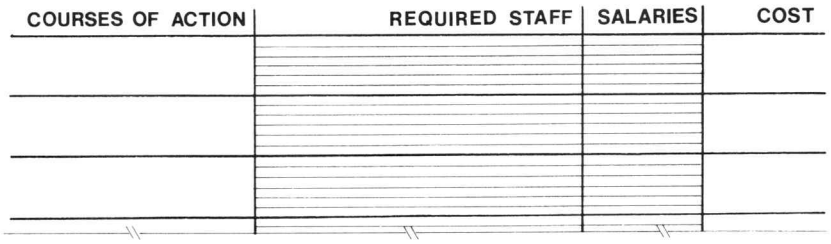
not all can be accomplished, nor by the means desired. Since certain Courses of Action can help to fulfill several Objectives, the members of the Decision Group can rate each Course of Action on the basis of how well they believe it to fulfill other Objectives. Educational Researchers present opposing views on the potential of each Course of Action to fulfill the other Objectives; the members of the Decision Group argue the relative worth of the Courses of Action and proceed to rate them on the Priority Ballot. A consensus score is calculated for each Course of Action, resulting in a priority list, the lowest priority Course of Action being the first to be eliminated or reduced in scale if budget constraints are not achieved later in the game.

Figure 5



At this point the first major Evaluation test is introduced. The Educational Researchers estimate the numbers and types of staff required for the Program, calculating salaries for the coming decade. If the cost of staff exceeds the expected budget, the Decision Group must return to their priority list and discuss alterations.

Figure 6



Cooperation It is important to note at this point, that the game time is equivalent to one year of planning and design. Because participants may come from

several walks of life and cannot afford to give up time from their employment, game playing would occur in the evenings, 4 hours/night. One week or approximately 20 hours of play is considered equivalent to one year of normal planning time. The Decision Group is informed about the amount of money in their budget available for their programming and design period. Therefore, it is within the interests of the Decision group to arrive at final decisions within one week, otherwise expenditures rise above the budget, requiring tax increases and a loss of power for those responsible for the delay. To achieve the cooperation necessary to expedite decision making, Game Monitors observe the Argumentation Routine of each Step, systematically scoring negatively those who delay proceedings with stalling tactics, unwillingness to compromise, irrelevant arguments, or failure to attend a session. These negative scores contribute to the reduction of that Interest Group's Power Factor for all subsequent decisions.

To return to the flow of the game, a difficult task now is in the hands of the man-environment researchers (Research Routine of Step 3), who must facilitate the transition from prescribing behavior (Courses of Action) to prescribing environmental quality to support that behavior. The game participants must now begin to define the character of the socio-physical environment. The appropriate sub-dividing of the behavioral system that describes the operations of the organization, is the conceptual issue of paramount importance here, as well as specifying the appropriate characteristics of the environment critical at the different levels of human aggregation. The theoretical development of such a schema is beyond the scope of this project. However, a temporary tactic was developed to facilitate this juncture, constrained by two factors: 1) being a game for lay participants, it must elicit responses without highly specialized jargon and 2) the constructs utilized in discussing real world phenomena should not differ vastly from those already in use by laymen.This is a difficult order for specialists, since the layman and his language may be the roots of important misconceptions about his environment. On the other hand, games

are intended to mix complex variables in their raw state where theory is yet unable to predict: the layman and his perceptions are purposefully being sought here to construe the environment from his point of view.

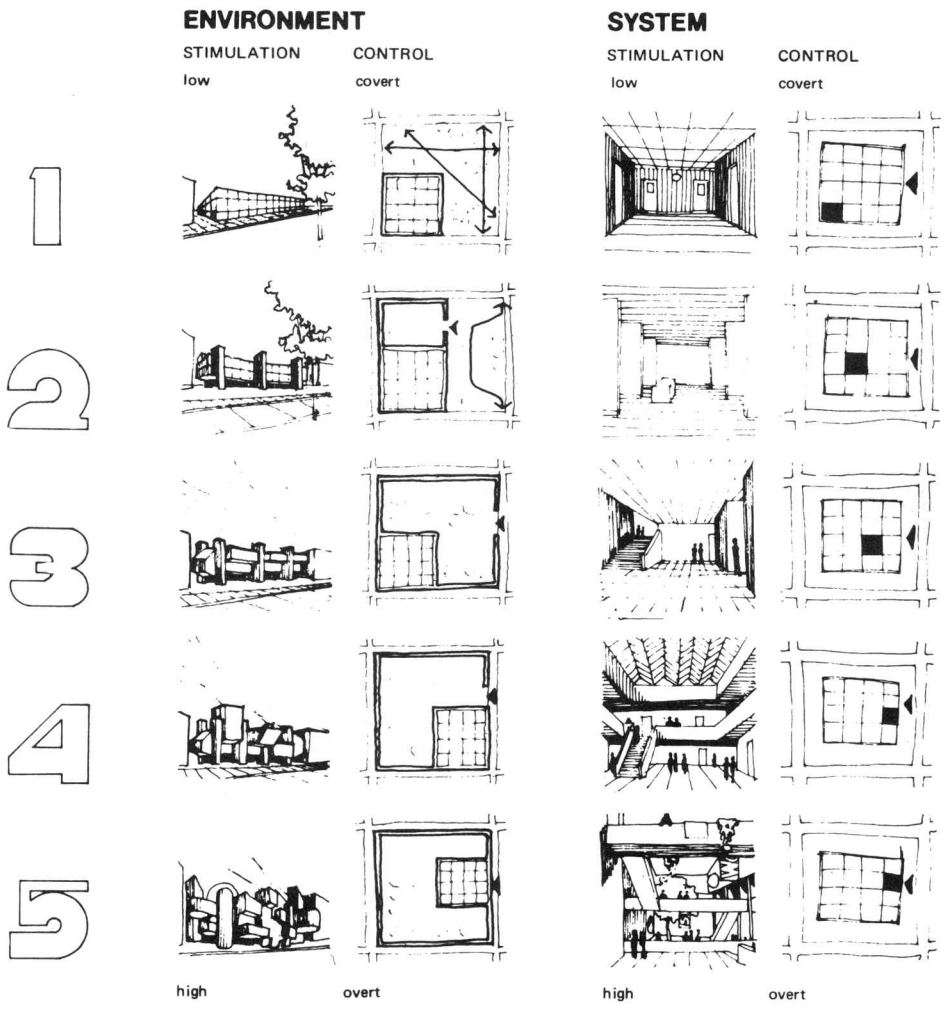
The human system was classified into four more-or-less decomposable levels of complexity, all of which are reflected in the pre-packaged Courses Of Action: components, or critical events which are deemed important to take place to carry out a Course of Action, usually including an individual or small group: subsystems of activity, or clusters of events which conspire to achieve the same subobjectives, comparable to a department within the organization such as Physical Education, a learning house, administration, etc.; the system as a whole, or cluster of subsystems of activities conspiring to achieve the overall objectives of the organization; and finally, the system's environment, human activities outside the organization but geographically proximate, thereby exerting pressures on its socio-physical environment.

Each of these levels of human activity shapes the physical environment at a different scale. With this in mind, twelve dimensions of the socio-physical environment were generated to qualify the union of prescribed human activities and their supportive physical systems. Almost all of these twelve dimensions have their counterparts at each level of complexity.

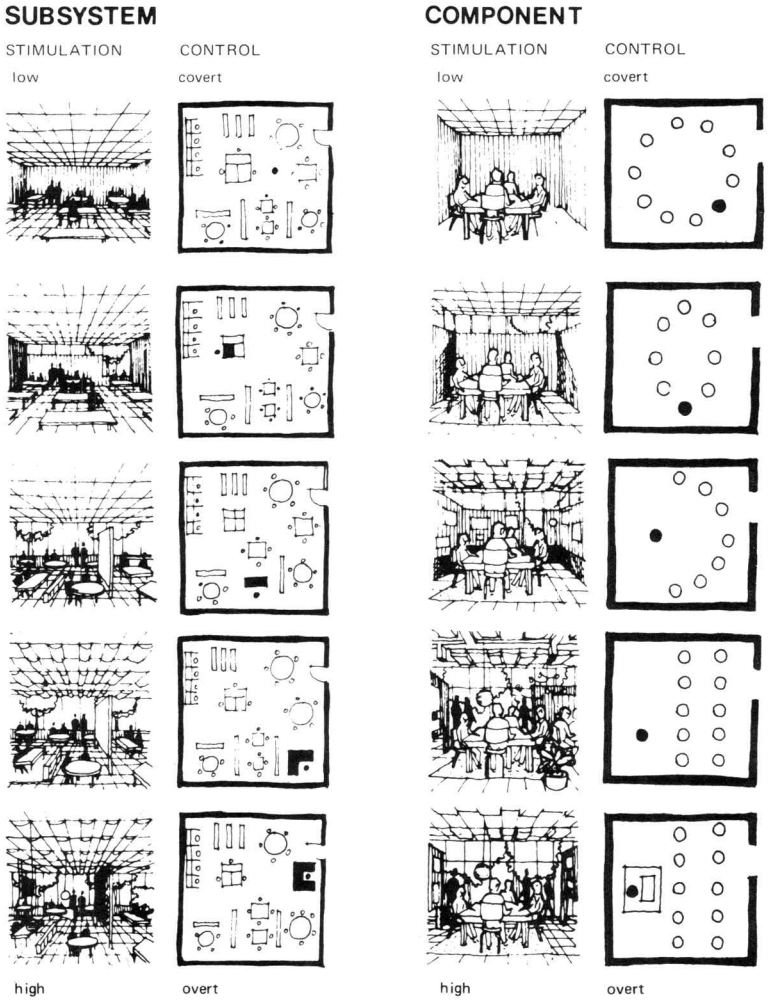
Figure 7

SOCIO-PHYSICAL REQUIREMENTS	COMPONENT	SUBSYSTEM	SYSTEM	ENVIRONMENT
CONTROL				
SOCIAL FOCUS				
PERMEABILITY				
VISUAL PRIVACY				
FLEXIBILITY				
MOBILITY				
ACTION				
STIMULATON				
CLARITY OF CUES				
CONNECTION TO OUTSIDE				
CIRCULATION				

Each of the twelve dimensions, which qualify behavior and environment, range on a scale from 1 to 5, expressing to what degree that particular characteristic might be desired. A set of five visual patterns was devised



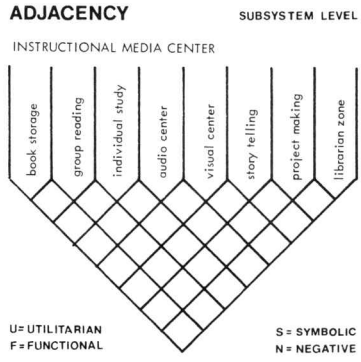
for each dimension at each level to help the participants understand what factors compromised a dimension and how they varied from one extreme to the other.



The man-environment researchers would present this information, and explain it to the Decision Group in the Research Routine of Step 3. They would also explain how the dimensions interact, where the choice of one degree of a dimension may eliminate some choice in another, and which degrees of which dimensions tend to increase the cost of the physical system.

As part of specifying the socio-physical environment, desired adjacencies must also be chosen for each level. For example, at the component level how should people and furnishings be distanced; at the Subsystem level, what component events should be located near or distant from each other; at the system level, what subsystems should be near of distant from the proposed building and its site activities. To facilitate these choices, small adjacency matrices are provided at each level. Players can decide to relate activities at the different levels by three criteria: What must be together for functional purposes; what must be together for symbolic purposes (perhaps to encourage interactions which do not normally exist between those activities); and for utilitarian purposes, activities which share the same hardware or space but other than that have no other connection. A fourth matrix is provided to record what activities must be kept apart.

Figure 9



Each of the small scale events or Components required in each Subsystem must now be qualified at the Component Level. These events were outlined in the pre-packaged Courses of Action, limited to no more than 10 per Subsystem. Only those Courses of Action which directly specify human events in space are used in this step. (Curriculum, Content, Community Involvement, Student Grouping, Teaching Techniques). Also outlined in the Course of Action packages were the major Subsystems of the organization. These may number 10 to 20 depending on the complexity of the organization. The socio-physical character must be selected for each Subsystem as a whole. The remaining Courses of Action (Control, Social Climate, Teacher/Student Relationship) mainly reflect desired attitudes about the social milieu of the organization, not directly generating activities, but specifying the tone or atmosphere which is intended to permeate the organization. These assist in qualifying the socio-physical environment at all four levels, but are referred to mainly while choosing socio-physical patterns at the System and Environment Levels.

Each member of the Decision Group receives a ballot book for qualifying the socio-physical environment after thorough discussion about the meaning and implication of the patterns. The choices are summarized into a consensus view, thereby generating the tentative requirements to be fulfilled during the Design or Modelling phase of the first iteration. It is important to remember that just as previous decisions are not binding, neither are these about environmental quality, for during the Modelling (Step 4), new ideas about the program and its environment will emerge as the participants work their ideas into more life-like, representational form.

The Decision Group is now ready to begin modelling the educational environment, another source of conflict. The different levels of the socio-physical system are obviously seeking to optimize their own requirements, but since they are highly interdependent and often in con-

tradiction, they are forced to satisfice. The list of socio-physical requirements for each level consists of two types: those which specify conditions internal to the level, and those which specify desired relationships to what may be outside it, that is, a higher or lower level. These latter requirements interconnect the levels but put them into conflict. The modelling of each level is pursued by separate sub-groups of the Decision Group: each sub-group struggles to achieve what was prescribed as appropriate for its level. Participants choose which level to design for depending upon their interests or competencies. A changeable model has been prepared for the Environment Level, System Level, and several for the Subsystem/Component Levels. The two lower levels are considered simultaneously in the same models since 10 Subsystems and 5 to 10 component events each would require too many participants, models and time. Hence, 10 Subsystems would require 10 models only, regardless of the number of component events in each: a Subsystem and its component events would be modelled together.

The Environment Model, at 1"=40'-0", includes surrounding conditions and pieces which permit the general patterns of Step 3 to be considered: large blocks representing functions such as Auditorium, Gymnasium, Swimming Pool; smaller blocks, 10'x30'x30' to be used in composing the learning volumes; areas for parking, roads, paved surfaces, formal athletic activities, play areas, trees. The school site itself is made of clay to permit major landscape and excavation decisions to be made. Each new school project would require its own new base to depict accurately local conditions and topography.

The System Model, at 1"=20'-0", contains a variety of floor shapes and sizes, with a smooth erasable surface to allow labelling of areas with flow pens, easily removable as decisions change. These are stacked on transparent supports at varying floor heights; elevators and stair towers of varying heights are also included. Different color markers are used to label the different Subsystems and the circulation.

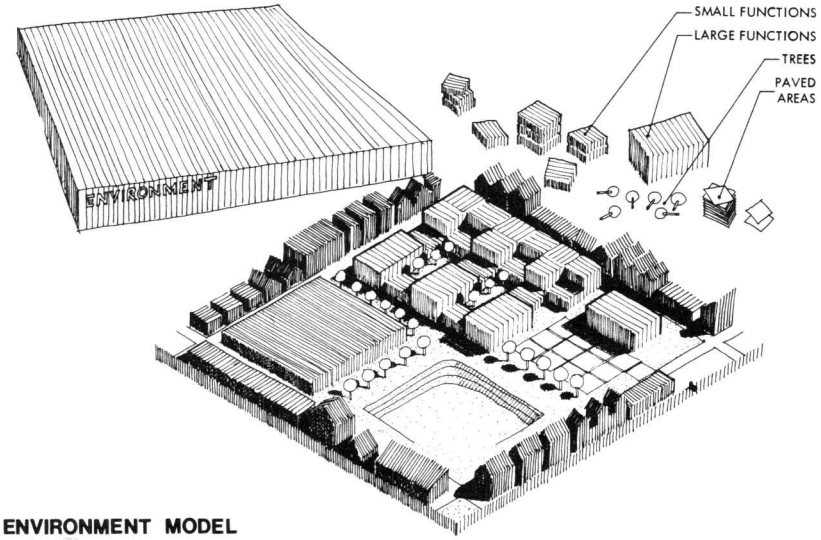


Figure 10 **ENVIRONMENT MODEL**

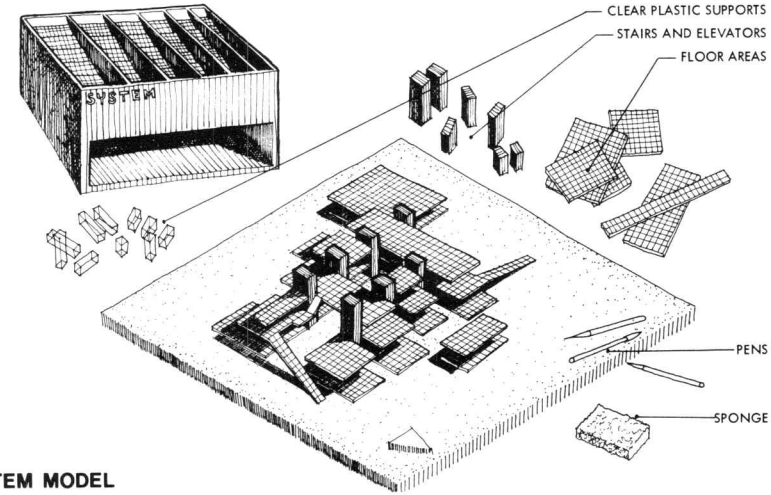


Figure 11 **SYSTEM MODEL**

The Subsystem/Component models, at ½"=1'-0" are the most elaborate. There is one for each Subsystem. These contain 9'-0" high exterior and interior wall pieces in 3' modules; a variety of movable wall systems;chairs, tables, desks, study carrels, a variety of storage units, work sinks, and cabinets, blackboards, tack boards, carpets, and human figures. The bases of these models are made of compressed cardboard to permit the walls with their base pins to be placed in a stable position.

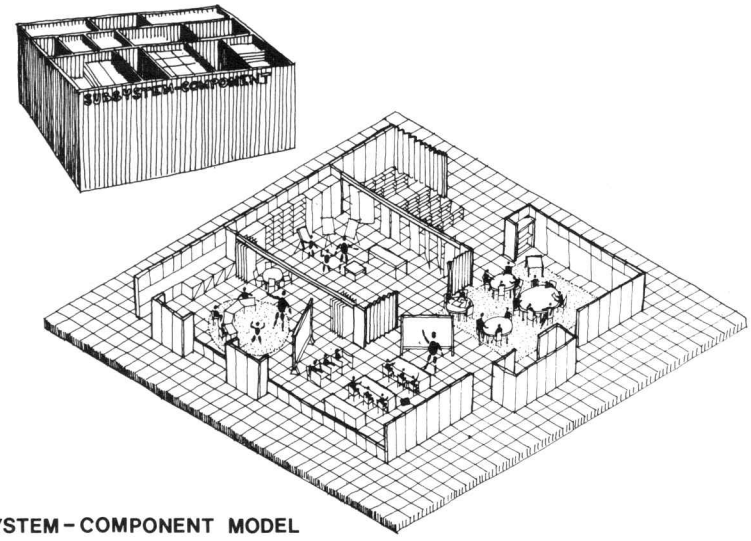


Figure 12 **SUBSYSTEM - COMPONENT MODEL**

The groups design with their models separately but simultaneously, each with the aid of an architect or his assistants, guided by the patterns chosen in Step 3. After a one to two hour design period, the groups review the state of their models to be sure they have achieved the desired qualities chosen in Step 3. Once they are satisfied, they must make an estimate of the cost of those elements of the physical system for which they were responsible. Each group has a Cost Calculation Sheet which the assisting architects use to make the first rough cost estimates. Each group was

given a rough cost allowance for those elements of the physical system that it must manipulate.

When all groups are satisfied that their own models have achieved the required characteristics and they are within their budgets, they then present their models to each other. The System group, since it is responsible for distributing the Subsystems according to desired adjacencies, and also insuring that those which asked for connection to the outside obtain it properly, becomes the central mediating figure between the Subsystems, and between the Subsystems and the Environment. Each Subsystem therefore is in competition with each other Subsystem to optimize its own socio-physical requirements. However, the System group, faced with these competing Subsystem demands, can only satisfice.

Each Subsystem reviews the System Model with a Conflict Checklist (Figure 13) to identify what decisions the System level made which conflict with what it demands for itself. To help reach compromise, a sense of priorities must be established to know which conflicts are more important to resolve. Each group must rate its socio-physical qualifiers with the aid of architects or man-environment researchers to determine which are high, medium or low priorities for its Subsystem. Certain socio-physical requirements are more important than others in supporting the desired human activities, as determined by the man-environment researchers (for example, the demand for privacy can greatly affect the choices in several other requirements, therefore, it is more important). Also, not all Subsystems are equally important: there are high, medium, and low priority Subsystems as determined in Step 2 when Courses of Action were ranked.

The Subsystems can now plot their conflicts into a Priority Matrix (Fig. 15) to see the order of resolution that the System group will follow. The Subsystems, listed in priority order across the top of the Matrix, enter

Figure 13

CONFLICT CHECKLIST

SUBSYSTEM:

SOCIO-PHYSICAL REQUIREMENTS	TYPE OF CONFLICT WITH SYSTEM LEVEL	PRIORITY
control		
social focus		
permeability		
visual privacy		
flexibility		
mobility		
action		
stimulation		
clarity of cues		
conn. to outside		
circulation		

Figure 14

CONFLICT CHECKLIST

ENVIRONMENT

SOCIO-PHYSICAL REQUIREMENTS	TYPE OF CONFLICT WITH SYSTEM LEVEL	PRIORITY
control		
social focus		
permeability		
visual privacy		
flexibility		
mobility		
action		
stimulation		
clarity of cues		
conn. to outside		
circulation		

Figure 15

PRIORITY MATRIX

CONFLICTS BETWEEN SYSTEM AND SUBSYSTEMS

	TOP PRIORITY				MEDIUM PRIORITY			LOW PRIORITY		
	learning house 1	learning house 2	learning house 3	instructional media center	gymnasium/pool	auditorium	health suite	community activities	administration	services
social focus										
permeability										
connection to outside										
flexibility										
control										
visual privacy										
circulation										
clarity of cues										
stimulation										
mobility										
action										

their high, medium, and low priority conflicts with the System level next to the appropriate socio-physical requirement. In resolving conflicts with the high priority Subsystems, the System group would be expected to compromise some of its own requirements; in resolving conflicts with the lower priority systems, the Subsystems would be required to compromise. The System group must resolve high priority Subsystems first, and only conflicts involving high priority socio-physical requirements. It proceeds through the lower priority Subsystems, again only attempting to resolve the high priority conflicts. Each conflict is given only 10 minutes for resolution; if it is resolved, it is eliminated from the Matrix, if not it remains.

The Environment group, is also exerting pressure on the System group, for it has developed its own idea about what is the best general configuration of the building as a whole, considering outside forces. Once the System group has reduced or eliminated the conflicts with the Subsystems in the high priority category, it must then turn to the Environment group to begin to assess differences and to modify itself as a result of these influences. A Priority Matrix is also used in this face-off (Figure 14). The System level must attempt to resolve the conflicts of high priority to the Environment group. In resolving these major differences with the Subsystems and the Environment groups, the System group must be sure to minimize compromise of its high priority socio-physical requirements. As each round passes, each group should become more and more familiar with the demands of other groups and sensitive to their implications. Conflict is expected to reduce as each level, in making decisions about itself, processes more information about the needs of other groups.

The first round Modelling and Evaluation ends after the System group has met with all Subsystems and the Environment group to resolve the differences in top priority categories. The group as a whole then calculates its score for that round. The score is an indicator of how much the

entire group has fallen below the acceptable achievement of all socio-physical requirements as a result of trade-offs and as a result of conflicts not yet resolved.

Figure 16

SCORECARD

	REMAINING CONFLICTS		
	TOP PRIORITY	MEDIUM PRIORITY	LOW PRIORITY
1 SUBSYSTEMS			
2			
3			
.			
.			
.			
.			
.			
.			
SYSTEM			
n ENVIRONMENT			
SUGGESTED DEGREE OF RESOLUTION TO END THE GAME	0	1/4	1/2

This process must continue until the entire group achieves a score of satisfaction, the entire Decision Group may decide to return to Step 3 and alter some of the socio-physical requirements to ease the conflict, or even return to Step 2 and alter a Course of Action by adding, eliminating or modifying a Subsystem or a Component. The level of satisfaction would vary for different Decision Groups. However, a suggested level of satisfaction for terminating the game might be when all high priority conflicts are resolved, one in four groups has a medium priority conflict outstanding, and one in two groups has a low priority conflict remaining.

If the Subsystems collectively believe that the System group (because of its own requirements or its respect of Environment requirements) is not meeting their demands sufficiently, they may take one of two routes: 1) argue that the entire Decision Group change the socio-physical require-

ments of the System level and/or Environment level by returning to Step 3, or 2) vote out the membership of the System group and replace them with Subsystem representatives who they believe will be more sympathetic to their demands when making System level decisions. It is obvious by sheer numbers, that the Subsystems could potentially have great control over the direction of the solution. This could lead to the spurious conclusions of local rationality, that a successful solution for a whole system is simply the sum of its successful parts. To counter such a development, the dissident former members of the System group, in conjunction with one of the architects could develop one or more schemes at the System level on the side with another model. They would intentionally seek to design strong, poetic images, purposefully seductive to prove that design is not simply an inductive procedure, but can result from intuitive preconceptions of the system as a whole. Such rebels could possibly invent a potential solution so enticing that the entire group may seize it, return to Step 3, and re-elect socio-physical requirements,systematically biasing the demands on the different levels so as to insure the development of this preconception during Modelling. This tactic could also be used if the group decided that the socio-physical requirements built into the game did not generate sufficient richness in the final solution, or had failed to demonstrate the imagination potentially available in the group. In addition to inventing poetic images of the whole and forcing it through, the group could add new socio-physical requirements to enrich the solution.

Inevitably, the program would be constantly under discussion during the Modelling step, and new insights will emerge about the potential of the program, having 'seen' it in space. Therefore, a return to Step 1 or 2 could very well happen after each Modelling iteration.

Summary

In response to the growing need for broader participation in the design of those environments whose users differ strongly in their values, such as in the case of educational facilities, professionals need to develop proced-

ures which expose the decision-making process to the users; and tap their experiences and preferences. Gaming seems to possess the ability to do this. The increased awareness of those who manage and operate educational organizations resulting from such a game will assist them in adapting their organizations to changes in their environment. Also, once facilities are in operation, the improved insight into the complex interactions of the psycho-social-physical environment could greatly improve the teacher's ability to adapt the physical system to program changes. Such a device can be modified and used once the school is in operation to simulate the design of proposed changes and their implementation by teachers.

AN ALTERNATIVE STRATEGY FOR PLANNING AN ALTERNATIVE SCHOOL

Henry Sanoff and George Barbour

Henry Sanoff, an architect, is an Associate Professor at the School of Design and is the director of the Community Development Group at North Carolina State University in Raleigh, North Carolina. Formerly chairman of the Environmental Design Research Association (EDRA), Mr. Sanoff continues involvement as a member of the board of directors. His major research interests evolve around the social implications of the environment, displayed by major publications such as Integrating User Needs in Environmental Design, Techniques for Evaluation for Designers, and Learning Environments for Children. Mr. Sanoff has published articles in Architectural Forum, AIP Journal, Progressive Architecture, House and Home, Neuf, Ekistics, Build International, and recently received a citation in the 1974 Progressive Architecture Awards Program for Research. He has lectured at various design schools throughout the country and presented papers to various professional groups including American Psychological Association, Human Factors Society, and the American Institute of Architects. At present Mr. Sanoff is developing continuing education workshops for the AIA in Architectural Programing directed toward professional architects.

George Barbour received a Bachelors degree from the University of Pittsburg and obtained his Masters degree in Clinical Psychology from Duke University in 1970. After serving his internship with Alemeda County Mental Health Services in Oakland, California, Mr. Barbour joined the Sandhills Mental Health Center at Pinehurst, North Carolina. He is currently a staff psychologist and director of a number of community-based consultation programs related to children and families.

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AN ALTERNATIVE STRATEGY FOR PLANNING AN ALTERNATIVE SCHOOL

Introduction

In the past decade, there has been a growing body of literature on the concepts of alternative schools, free schools, open schools, and non-graded schools. Unfortunately, there has been little documentation of the process by which these educational options have been accepted and implemented in individual schools. This paper focuses on a strategy for developing an alternative school and on techniques which can facilitate the planning process.

The process began when the board members of the Wallace O'Neal Day School, a newly-formed private school in Pinehurst, North Carolina, developed a long-range building plan which included a new facility for a proposed kindergarten-through-ninth-grade program. In the course of interviewing architects for the design of the new school, the building committee encountered one architect who suggested a participatory planning approach involving members of the school community as well as architects and consultants. In sharp contrast to other presentations based on the architect's experience in planning educational facilities, the building committee was invited to become involved with students, teachers, architects, and consultants in the creation of an educational program as well as a building. Their acceptance of this pluralistic approach is a measure of the commitment of the Wallace O'Neal community to their school.

The major objective of this proposal was the creation of a parent-child coalition to develop an alternative educational program and to plan and implement physical spaces to complement that program. The

process for reaching this objective is frequently referred to as a "charrette", from the French term which in architecture implies a period of brief but intensive planning.

In its present adaptation, a charrette is an activity that brings community members and experts together, for a limited time period, to study specific community problems. The essential ingredients are:

(1) A problem to be solved
(2) Community members willing to participate
(3) Experts in both substantive and process issues
(4) A commitment to implement the plans and recommendations of the charrette

The concept of community participation is fundamental to a charrette, and sets it apart from problem-solving methods which involve experts but exclude people. A school planning charrette involves the consumers: the teachers, parents, and children who will have to use and "live with" the results. The most valuable by-product, one which in many ways gives life to the results, is the sense of commitment and cohesiveness which grows from the struggle of planning together.

The School

The Moore County Public School System, which includes the Pinehurst-Southern Pines area, is in many ways one of the most progressive in North Carolina. Several of the schools in the area provide open classrooms, non-graded classes, team teaching, and other innovations that are still relatively rare in public education.

Even so, the Wallace O'Neal School was created as an alternative to this public system, and the motives for this shift were fundamental to the emerging educational program. There was an expressed desire for "quality" education of a kind to be achieved through energetic, well-

paid teachers and relatively small classes. (To some, the notion of "quality" was inextricable from the prestige of a private school). Equally significant was a determination to develop a school that would be responsive to both the needs of the children and the wishes of the parents. There was a feeling that the public schools were too large, too bureaucratic, too inert to be affected by any individual, whether teacher, child, or parents. The desire to participate and to have an effect is an important motive in the creation of any alternative school, and the charrette process is an especially appropriate planning mode in such a situation.

These ideas were the beginnings of an educational program, but there had been little articulation of their relevance to the day-to-day workings of a school; in fact, there were, within the school community, some latent but very strongly felt disagreements about the best way to implement the program. The parents had discussed their objectives in general terms; the structure and techniques of the school were left to the headmaster, who was selected because he shared these objectives.

The school's orientation had been relatively traditional in its distinction between "academics", which are emphasized, and "non-academics", which occur during semi-structured "activity periods". The major academic areas were English, math, science, social studies and art, which were taught in age-graded classes involving lecture discussion, and individual or small group assignments. The school day was divided into uniform time periods with movement from subject to subject according to an established schedule. On a continuum between child-centered and teacher-centered approaches, the Wallace O'Neal program was best described as teacher-centered, with emphasis on the teaching of subject matter rather than on students learning. There were points at which this structure did not fully match the philosophical orientation

of some parents and board members, but potential disagreements were muffled by apprehension about an alternative structure.

The Charrette Team

The planning team for the charrette consisted of William Laslett, the project architect, and members of his staff; Henry Sanoff, architectural consultant and charrette planner; and George Barbour, psychologist at the local mental health center. Also involved on a less regular basis were architects from the Department of Public Instruction, representatives from the Learning Institute of North Carolina (LINC); and Joan Sanoff, the child development specialist who conducted the children's sessions. This team was responsible for planning the charrette period of three evenings and three full days bridging a weekend.

A series of team meetings was held during the months prior to the charrette itself. These sessions proved essential to the effectiveness of the team by clarifying the roles of the participants, both within the team and in relation to the Wallace O'Neal community. This latter point was particularly important because it raised the issue of potential philosophical conflict between the team and its clients.

The probable traditionalism of the Wallace O'Neal community was recognized (and somewhat exaggerated) in the early team meetings, and we were aware that at least some of the client group were apprehensive that we might have a hidden agenda of propagandizing for a "radical" school program. Since many of the team members were, in fact, interested in developing a non-traditional program and building, the problem was genuine and carried the risk of a disintegration of the working relationship.

Within the team the issue was dealt with in terms of relative emphases. Was the team composed of "experts" whose responsibility was to advocate their own opinions of the best educational direction for the school, or was it to be a group of "consultants" whose obligation was to help the Wallace O'Neal community articulate and implement its own ideas?

Although the question could not be resolved completely (for this particular group or as a general consideration), one decisive factor was that the original charrette presentation had emphasized the "consultant" role and had been accepted on that basis. For this reason, it was generally agreed that the team would serve a facilitative role and that our biases, though present, should not be allowed to interfere with the growth of consensus within the client group.

The charrette began with a morning-long children's session conducted by Joan Sanoff. In the following week, charrette sessions were scheduled for Tuesday, Wednesday and Thursday evenings as well as the following Saturday and Sunday afternoon. Invitations were extended to the entire Wallace O'Neal adult community; parents, board members, building committee members, and faculty. The desirability of representatives and continuity of participation was emphasized; but, although this ideal was approached in the early sessions, the group was soon reduced to the faculty and those building committee and board members who would carry the greatest responsibility for implementing the decisions emerging from the charrette.

The Children's Session

The charrette team felt that it was important to have the children of the school understand the events that would be taking place and to give them an opportunity to generate ideas of their own about the kind of school they would like to have. Because their direct participation in the charrette was not considered feasible, Joan Sanoff agreed to conduct a session at the school in which the children could, through various exercises, be made a part of the planning process. Although the children's group was limited to 14 children, the involvement, enjoyment, and productivity of these children suggest that their wider participation can and should be considered an integral part of any school planning process.

The "Wish Poem"

The session opened with the construction of a collaborative poem, a group of statements composed of responses to the phrase, "I wish my school. . .". This approach was developed to minimize the effort children expend in finding rhymes, an effort which usually stops the free flow of their feelings and associations. The formal repetition of the same words is designed to encourage freedom and imagination. The results show a number of clear educational and architectural objectives: spatial and temporal freedom, variety, spontaneity, and a sensuous appreciation of objects and settings:

I Wish My School

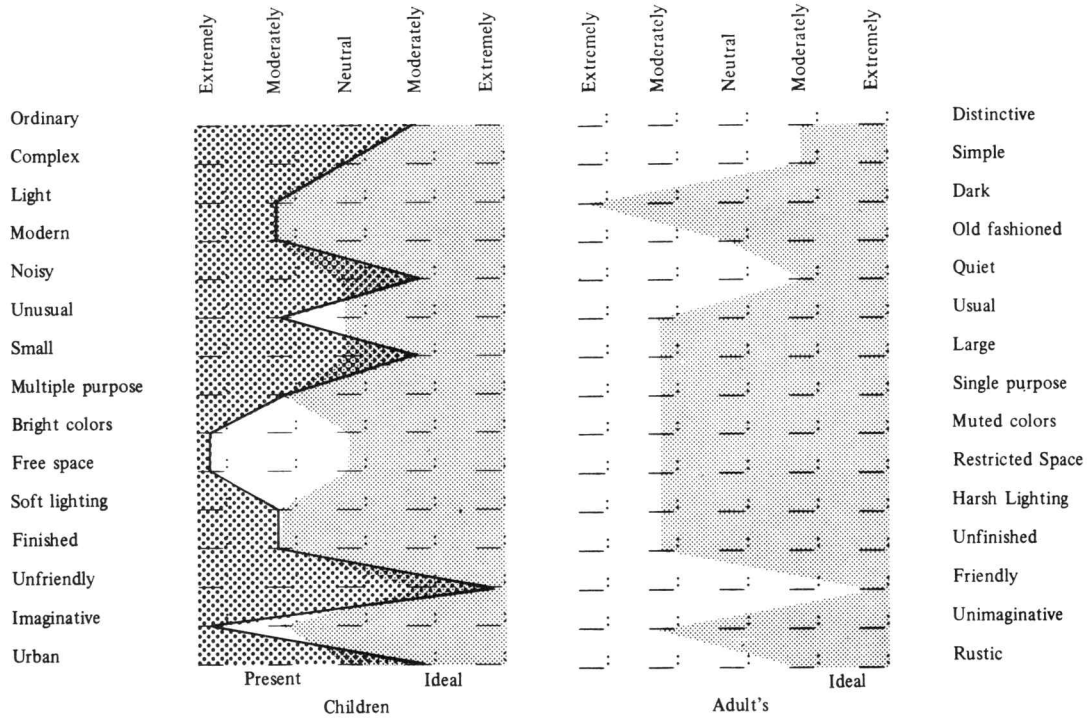
I wish my school to be the neatest place in the world.
I wish my school to be very unusual.
I wish my school to be out-of-the ordinary.
I wish my school to be a nice place to go to instead
of a torture chamber.
I wish my school to have many different things
going on.
I wish my school would be pleasant to come to
and still be learning all the things
we need to know.
I wish my school to be
as free as it could be
unless we broke a rule
and destroyed the privilege.
I wish my school to be a place you
can go
anytime of the day.
I wish my school could be
as fun
as it is hard.
I wish my school to have freedom of choice.

I wish my school to be as long as I want it.
I wish my school to be without classes
and mostly recess.
I wish my school to be beautiful
with lots of trees
and not big brick buildings.
I wish my school to have bright colors.
I wish my school to be seen and be noticed
when someone is driving
on the road.
I wish my school to be nicely planted
with bushes and flowers.
I wish my school to have many things
you can play on,
inside and outside.
I wish my school to be a racetrack,
a baseball diamond,
a horse stable.
I wish my school to be with teachers
who don't boss you around.
I wish my school to have breaks
after every class.
I wish my school to have a
little store
where you can buy cokes,
candies,
sandwiches.
I wish my school room to have
an upstairs
and to have stairs that
go around and around.
I wish my school to have lots of room to run.

The Rating Scale

The second exercise asked the children to rate, on a bipolar adjective scale, their present school environment and their conception of an ideal environment. The resulting comparison shows that, in general, the children liked many features of their present facility, but wished for a school that was more "unusual" and "imaginative", more "spacious" and "colorful", and had more "free space" than presently available. Since the school was located in three semi-permanent modular units, these expressed desires for variety and space are not particularly critical of the way in which the school was using the limited space available.

Attitudes Toward the "Present" School Compared to Images of the "Ideal" School
(utilizing a bi-polar adjective rating scale)

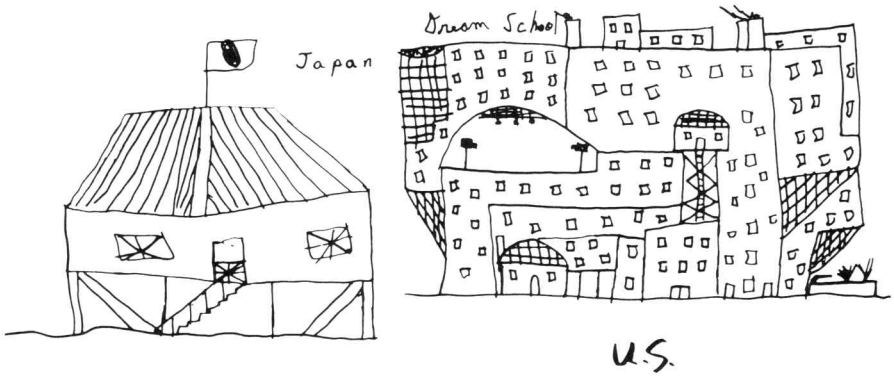


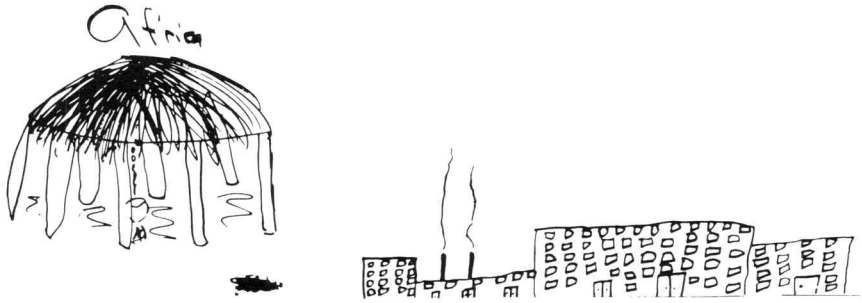
School Drawings

The third exercise asked the children to draw pictures of four archetypical schools: an African school, a Japanese school, a "typical" American school, and their "dream" school. While the sketching ability of the children varied, their perception and portrayal of the archetypical cues of each model were very astute. It is particularly interesting to note the contrast between the "typical" American school, usually portrayed as a monotonous, factory-like brick box, and their "dream" schools. These ideal representations are remarkable in their innovativeness and frequent complexity; many were multi-level and an elevated "tree-house" structure was a common theme. Here, as in the Wish Poem, the desire for variety and spontaneity, and for the sensuousness of sunlight and texture and color were apparent. The children wanted an environment they could enjoy, where they could be attracted to variation in color, texture and spatial configuration.






Japan
Dream School
U.S.


Africa

Role Play

The fourth exercise was an introduction to the process of planning a school through a role-play simulation of the charrette itself. Children assumed various roles, each prescribed by the group leader to represent clearly-defined and in some cases antagonistic viewpoints about the kind of school they would create. Some children had difficulty taking part, but others were quickly transformed into sophisticated and uncompromising advocates for their point of view.

Instructions

The purpose of this game is to decide what you want your school to be. By assuming these different decision-making roles, you will be taking various positions which may be in conflict with each other, and presenting different viewpoints.

The Architect: You are designing a school for this community. In order to successfully achieve this end, you must find out from the building committee, parents, teachers and headmaster, what the educational objectives are. Each of the participants contributing ideas may create conflict. Your role is to direct the group to reach some agreement about goals and objectives.

Building Committee Member-Minister: You, the minister, are concerned with religious education. You desire that more time be committed to the teaching of the Bible as an important part of the educational objectives.

Building Committee Member-Doctor: You, the doctor, feel that academic achievement is of utmost importance. There should be an emphasis on learning facts and information and do away with all this freedom nonsense of the child pursuing his own interests. Learn and get good grades so your child can get into a good college.

Building Committee Member-Builder: You, as the builder, are concerned with cost of construction. To you, a good school means sound brick construction at a low cost. You will support most ideas about education as long as they do not interfere with a sound building.

Parent No. 1: You are sending your child to this school so he can be

with children of his own social level. The public schools expose your child to children you would not want him to become involved with—"children not of his own kind".

Parent No. 2: You feel that this school can offer your child better academic opportunities. You are interested in your child learning the three R's and getting good grades so that he can succeed in life.

Parent No. 3: You feel that the public schools don't understand your child. He does not get along with the teachers. They pick on him for things he does not do and accuse him wrongly. You feel that in this school with small classes and better teachers, he will be better understood and do well.

Teacher No. 1: You believe in a strict schedule. All children do all activities together. They are assigned tasks and must fulfill their assignments. One afternoon a week is set aside for "free time".

Teacher No. 2: You believe that with appropriate materials and guidance in their use, children can proceed at their own rate and interest. They are free to question the teacher and ask for help when needed. Children can move about freely with the teacher's permission.

Headmaster: You, the headmaster, feel that education is self-directed. Each child pursues his own interests at his own rate of development. Each child receives individual instruction as required.

These role play activities provided at least some of the Wallace O'Neal students with an opportunity to understand and to feel a part of the school-planning process. More generally, the results establish the principle that, as members of a school community, students can grasp the nature of the process (including the practical "adult" concerns) and can make effective contributions to the design of programs and facilities. Client groups will differ, of course, in the legitimacy or importance they ascribe to the ideas of the students, but it seems clear that those who are willing to listen can learn from their children.

The Charrette Sessions

The overall goal of the charrette was to help the Wallace O'Neal community compile information about itself, information that could then be used to create and evaluate an architectural design. Over the course of the charrette, the team used a number of techniques and strategies, each designed to generate, summarize, contrast, and translate into spatial terms the information and ideas of the client group.

The first evening session opened with introductions and general statements about the goals of the charrette. Joan Sanoff, as coordinator, then introduced the procedures of the Children's Session by having the group produce a Wish Poem of their own, a combined statement of their aspirations for their school.

I Wish Our School

I wish our school to begin with the piney woods.
I wish our school to be one built for the activities of those involved in it.
I wish the structure to be as exciting for those who use it as it is for those who view it.
I wish for our school to be free.
I wish our school to be a fun place to learn for children and teachers alike.
I wish our school could be spacious, full of good books and free for each child to express himself and grow in body and mind.
I wish the school would be a place to look forward to, a place to do lots of different things.
I wish our school would develop into a model after which the public school would follow because they are far from perfect—far from good or adequate.
I wish our school could work with the less fortunate children in Moore County, who must go to public schools.
I wish our school a happy future, one in which new ideas can be tried

out—and discarded if need be—a school of happy children
learning to learn.
I wish my school to be a place where I want to go and no one has to
tell me to.
I wish my school to have teachers who will talk to me
and find out what I want to do.
I wish my school to have people to talk to about
who I am and who will talk to me about who they are.
I wish that we had a school where children are turned on, not off, to
education.
I wish the children to be able to experience far more than
textbook learning; more than just academics.
I wish our school could make books, blackboards, pencils, and papers
to be more than mere tangible things.
I wish our school could respond to the emotional needs of our children.
I wish our school could foster social awareness and display by its
existence, alternatives to narrow-mindedness, inequality and
social injustice.
I wish our school could give a sense of awareness, to teach sight, sound,
taste, touch, and smell.
I wish our school could cultivate a sense of responsibility for community,
nature, and all mankind.
I wish our school could stimulate, prod, and provide, inspire questions,
and provide avenues to find answers.
I wish our school could excite and stir the imagination of parent, child,
and teacher alike.
I wish our school were fun and free
Where children love to learn and see.

The children's poem and their drawings of archetypical schools were presented and discussed, and the role-play session was described. It was clear that the meaning of this material varied within the group; some participants, particularly the faculty, seemed to feel that it was an important contribution in its own right, while others used the discussion

as a basis for raising concerns about the nature and goals of the charrette.

Some parents were distressed by the stereotyped roles given the children for the role-play session; they were concerned that these exaggerations reflected the consultants' perceptions of the Wallace O'Neal group. This discussion (which might have been avoided with a clearer description of the role-play rationale) was useful in allowing an airing of this issue and seemed to establish a greater trust in the consultants as facilitators rather than potential critical "outsiders".

Another issue had to do with the format of the charrette itself. The planning team had decided that a sound building program could be derived only from a clear and consensual educational program, and for this reason, the bulk of the charrette time was scheduled for discussion of education issues. This choice was questioned from a number of viewpoints: some felt that the educational program was already clear and that they should begin planning the building, others felt that they had nothing to contribute to a discussion of educational objectives, still others seemed to feel that the consultants were avoiding their responsibilities by expecting the school community to produce its own plans and ideas. Again, this discussion was based on vital issues and helped to clarify both the goals of the charrette and the roles that the consultants felt that they could legitimately play in reaching those goals.

Not everyone accepted the results of these discussions; some dropped out and others remained skeptical, but most accepted the opportunity to become a part of the process.

With these issues partially resolved, the second and third evenings were used to formulate a consensual educational program. The primary technique for this purpose was the use of The Game, a simulation of the school design process developed by Henry Sanoff and the Community

Development Group, for the Learning Institute of North Carolina (LINC). The game consists of four decision-making steps, with each part contingent on the product of the preceding steps. At each step, the individual participant is required to select from a limited universe of choices, and to define and discuss their own selections in the process of agreeing on a group product.

GAME

The four steps of the Game are:

1) Objectives: The group is presented with a list of 39 educational objectives, covering a wide range of philosophies. Each participant selects the four which are important to him; through discussion the group then reduces these to four which represent their generally agreed goals.

2) Techniques: Given their four chosen objectives, the group is presented with a list of educational techniques, again reflecting a wide range of possible instructional philosophies. Individually, and then as a group, they are required to select four techniques which seem most appropriate to each of their original objectives.

3) Interactions: The group is presented with a series of cards, each represented in an abstract drawing, a type of interaction of relationship among the elements of a school (teachers, students, boundaries, equipment, etc.). Through individual and then group decisions, the group selects an interaction mode most representative of each of their chosen techniques.

4) Settings: This represents the final step in a simulated movement from abstract goals through concrete techniques to a physical setting. The participants are given cards showing sketches of learning places (classrooms, offices, lounges, etc.). They are required to select two settings to match each objective and the techniques and interactions connoted by that objective.

In order to work through The Game, the participants were divided into groups of 4-6 members, with one of the consultants assigned to each group. The consultants did not participate in decision making (and were not invited to); they were available to explain the rules, to help define terms, and to facilitate the process of explanation, argument and agreement within the group.

It was found that the groups varied in their ability to use the process productively and that different groups faltered on different steps of The Game. In general, the Objectives step was helpful in providing each individual with a framework for articulating his own ideas. However, it seemed less useful in the creation of a group agreement because of the compromise necessary in reducing the individual Objectives to a single set. It was clear, though, that the exercise provided each group member with a greater understanding of the interests and goals of his fellow participants, and some working bonds were established in this phase.

Some participants felt unable to deal with the Techniques step because of the seeming infringement on "professional" grounds. Others rather mechanically assigned techniques to the objectives with considerable thought. For most groups and participants, though, this step was the beginning of discussion about the relevance, desirability, and implications of unconventional techniques such as nongradedness and student decision-making.

Though designed as a bridge from the conceptual to the graphic modes, the Interaction series was, in general, too complex and abstract for many of the participants. In most cases, the process was one of simply locating the Interaction card which described the Technique they had selected; and little additional information about the nature of that Technique was generated.

The groups varied widely in the ability to use the Settings discussion. Most of the groups were able to advance meaningful educational choices by considering the wide range of spatial alternatives in which their Objectives and Techniques might be implemented.

Overall, it was clear that each member of each group had been given an opportunity, at some stage of the Game, to define and defend his own ideas and to reach out for agreement and shared understanding within his group.

The five groups participating in the gaming sessions selected a total of ten different goals, two of which, were common to four of the groups. These goals were "developing a sense of responsibility" and "developing motivation for learning. . .". The goals and associated techniques for each of the groups are described in the following table.
The game props provided an opportunity for the participants to involve themselves in group problem-solving process as well as begin to consciously define educational objectives. This was the preliminary to the weekend sessions, which are devoted to the actual goal setting for the new Wallace O'Neal School.

Resolution of Gaming Session

The weekend session began with board members, teachers and parents assembling to reevaluate the findings of the previous game sessions, and to reword, clarify and amend the material into a new set of goals that the entire group could support.

A few new participants joined the planning group and were readily accepted and acquainted with the previous processes and decisions.

An Example of Goals and Techniques Selected By One Group from the Gaming Process

Goal: Developing a Sense of Responsibility

Techniques:
- independent study
- non-graded classes
- field trips
- competition

Goal: Developing Motivation for Learning

Techniques:
- lecture-demonstration
- one-to-one student/teacher
- accessibility to resources
- student planning

Goal: Developing Communication Skills

Techniques:
- one-to-one student/teacher
- peer counseling
- accessibility to resources
- self-presentation

Goal: Developing Self-Actualization

Techniques:
- non-graded classes
- independent study
- student planning
- one-to-one student/teacher

Goal: Developing Resourcefulness

Techniques:
- accessibility of resources
- lecture/demonstration

competition
student planning

The collaborative Wish Poem was reviewed, and from it, the following educational objectives were distilled:

Fostering social awareness
Working with less fortunate children
Experimental learning
Responding to emotional needs
Challenging students
Being one's self
Learning for children and teachers
A sense of awareness
Freedom of self-expression
Community responsibility
Happy children learning to learn
Teacher responsiveness to parents

With these statements and the Game Objectives in mind, the group was asked to meet without the consultants and to produce a set of goals, written in their own words, that would stand as the objectives of their school. They returned after a long and often boisterous discussion, with a list of thirteen statements that they felt satisfied with.

Two techniques were then used to establish the school's priorities within this list. In the first, the thirteen goal statements were randomly divided into four groups. The participants then chose, by voting, the most important goal statements in each group.

The second procedure used a paired-comparison technique to establish a rank ordering for the entire list of statements. The participants were

asked to compare each goal statement with every other one and to select from each pair the one that was most important. Although this required 78 separate decisions (12 objectives x 13 comparisons, divided by two), the procedure was carried out easily and the results were tabulated immediately.

The same three goal statements were selected as most important in both procedures; the fifth most important according to the paired-comparisons had been among the first in the voting process. This provided a believable level of agreement between the two procedures.

The final thirteen goal statements, ranked according to the paired comparison process, are listed in order below:

A. Developing a sense of responsibility
B. Providing an atmosphere of trust
C. Developing motivation for learning
D. Developing a realistic self-image
E. Encouraging student's sense of community identity, and social awareness
F. Developing and encouraging resourcefulness
G. Stimulating curiosity and imagination with an initiative towards creativity
H. Developing communication skills
I. Developing persistence towards a goal
J. Developing a tolerance of differences
K. Developing a sense of achievement
L. Involving parents in the education experience
M. Developing motor skills

This product, their own goals clearly ranked according to their own priorities, provided a great sense of satisfaction for the school commun-

ity. They were especially pleased that their overall objectives emphasized personal growth rather than a concentration on academic achievement.

From this consensual base, a model was proposed for translating the community's objectives into instructional procedures and subsequently into educational settings. The first goal statement, "Developing a Sense of Responsibility," was used as an illustration by soliciting responses for instructional methods to implement this goal, using the alternatives already familiar from the Techniques session of The Game. Some of the methods suggested were:

Independent Study
Experimentation
Small Group Activity
Problem Solving
Role-Playing
Lecture/Demonstration
Group Discussion

A notation system was produced for classifying these instructional methods according to the student/teacher relationship:

TD—Teacher-directed
CD—Child-directed
TR—Teacher as resource
C—Collaborative learning

Each of the proposed methods was then coded according to student/teacher relationship and evaluated against the thirteen goal statements in order to determine the methods and relationships best suited to the program objectives. This analytic process enabled the group to more fully understand the means by which their goals could be realized. It also

held in abeyance emotionally loaded discussions of "open" or "non-graded" classrooms until some general understanding of children's learning processes was shared by all participants. This helped prevent the "fixing" of concepts too early in the planning stages by allowing solutions to evolve through goal-oriented discussion rather than arguments based on pre-judgment. In this way, the architect (who participated in all the sessions) was given a more complete view of the intention and direction of the school program and, as a result, was in a position to generate alternatives appropriate to this community's needs rather than having to follow currently fashionable prototype.

This session heightened the confrontation between the faculty and the parent as, during the process of associating learning methods with objectives, it became clear that the student/teacher relationship should be a function of the goals intended, irrespective of the popularity or convenience of any "teaching" model. The teachers were made aware of the fact that, while they had a body of knowledge to convey through the academic curriculum, the school's objectives were to determine the way in which students were to be exposed to "content" areas.

All preceding discussions had centered on the development of a consensual educational base from which a building program could generate. The following session attempted to synthesize previous discussions through the pictorial representation of the newly formulated goal statements and methods. While the Charrette participants suggested learning methods and activities, a team of architects responded with spontaneous sketches depicting the physical realization of the proposed ideas.

This session had a two-fold impact on the community group. First, it permitted the participants to view the architect's interpretations of verbal statements into physical form; second, the participants became more

sensitive to the processes designers utilize in shaping space. While it was evident that the emerging forms were merely illustrative suggestions, the group's awareness of the linkages between learning techniques and appropriate spaces was substantially sharpened.

Although this marked the end of the planned activities, the Charrette was extended at the request of the participants in order to provide more specific design directives to the architect. The intention was to describe all of the activities that the children would engage in (the activities that the facility would be designed to serve) and to select the learning methods most appropriate to the objectives of the school.

The primary activities of the school day were initially defined as follows:

Math
Science
Social Studies
English
Drama
Music
Art
Construction
Sports
Independent Study
Language Arts

It was clear, however, that there are secondary activities which are necessary to support the fulfillment of the primary activities: food preparation, storage, toilets, circulation, etc. It was agreed that the architect had sufficient technical knowledge to resolve the requirements of the secondary activities.

In order to facilitate a productive discussion, data sheets were prepared whereby each activity could be treated independently. This allowed an assessment of appropriate learning methods, student/teacher relationships, and the spatial and material requirements. The data sheet became a permanent record of the requirements of the facility as the development of each of the primary activities suggested its relative importance in terms of the allocation of spaces. This provided the architect with a reasonable starting point for the development of a building design as he assumed the role of translating objectives, methods, and activities into an accommodating organization.

The Charrette had reached this point through a series of structured techniques which had enabled the participants to define, with increasing confidence and independence, their educational objectives and the type of environment they would need to implement those objectives.

GAMES FOR USER PARTICIPATION

The Community Development Group, under the direction of Henry Sanoff, was created in 1968 as a program option in the Department of Architecture of the School of Design. It is, primarily, a service-learning program in an atmosphere of continuing research. Drawing on its interdisciplinary resources, CDG addresses actual issues confronting various agencies, citizens' groups, and communities throughout the state adjunctly creating as well as broadening the present view of "design." Design is viewed as a problem-solving process. In attempting to solve problems here-to-fore unresolved or even unaddressed by the design profession, the Community Development Group has devised alternative approaches to problem solving.

This section proposes to illustrate beginning methods of user participation in the decision process effecting the quality of the built environment. In attempting to involve that population affected by design decisions, it is evident that there needs to be specific techniques and strategies to activate the expertise of the user. Similarly, it is necessary that user participation strategies are designed to involve people at the level of their competence.

It has been evident that the last decade was marked by the increasing awareness of methods and procedures utilized by designers in accomplishing their tasks. Clearly, however, the methods have been predominantly introspective, yet objective, but generally widening the gap between the professional and the user. In an effort to move design activity closer to implementing changes in the environment, it becomes necessary for the methods to fulfill new purposes. Essentially, the primary focus for the future is the active involvement of all those whose interests are affected by a design and planning problem. The methods in this section are but one means toward that end. The following games were developed by students in the Community Development Group, in the School of Design, North Carolina State University.

Henry Sanoff

ROLE:RELATING OBJECTIVES FOR LEARNING TO EDUCATION

Henry Sanoff

It is often argued that the purpose of the built environment is to support human needs and purposes. If the designed environment is to provide opportunities for human endeavors there should be a clear understanding of the primary intentions for which the environment must serve. In an effort to clarify this relationship and explicate the structure in which these relationships might occur, a negotiation strategy was developed to support the notion that there are many areas of expertise required in the programming of the built environment; the architect shares only a portion of the needed insight in order to accomplish an isomorphism between needs and physical form. ROLE (Relating Objectives for Learning to Education) is a simulation - an abstraction of a complex process - designed to integrate the knowledge and experience of the players (Architects, Educators, Teachers, Administrators) into a circusmcribed set of activities. The activities are sequential in order for the players to conceptualize the linkages, although realistically the process would be iterative. The concepts of negotiation was employed to suggest that all affected users should be involved in the decision making process since they all share some expertise in the problem. Similarly, the outcome or resulting environment serves people whose needs and aspirations vary. In order to address this variance, it appears that a structured and participatory process might best distill the participants dispositions. Clearly, ROLE is a vignette of issues that should be addressed in the man-environment-mileau. Its primary purpose is to increase the level of awareness of the diverse participants who are obliged to come together to fulfill a particular mission. It can provide the designer with insights into the nature of goals and methods for their accomplishment as well

as the way the physical environment can enhance its primary purpose. For the non-designer, the process can reawaken the importance of decisions about the physical environment and the inextricable linkage of the designed outcome to its original intention.

The focus of ROLE is on education - since it is evident that there are various philosophies about learning, as well as priority differences within similar philosophies. While it recognized that the physical environment is not deterministic in shaping human behavior, its role is clearly supportive of human dispositions. This is particularly appropriate during an era when learning is recognized as varied and continual; and the physical environment, as a stimulus for curiosity seeking behavior and exploration.

In planning for efficient and effective achievement of educational objectives it is necessary to consider the following: Learning methods to accomplish the Objectives; Role Relationships between student and teacher, (whether child or teacher directed); and Setting, or environments in which Learning Methods will be accomplished.

The game is planned to be played by a group of three to five people. To begin, each player individually selects, from the listing on the sheet, no more than four objectives which seem to him to be the most important. Brief notes should be made justifying each choice. After each player has made his choices, the individual lists are pooled and the corresponding Objective cards are pulled from the deck. Through negotiation the group must choose from these no more than four cards, with the additional constraint that these four must be made to be incorporated into a single, unified educational program. Players are urged to forcefully support their individual choices, even if other members did not make the same choice, until they persuade or are persuaded by others that an Objective should or should not be included in the final four. This may require considerable discussion. Time should be limited to about twenty to thirty minutes.

When concensus is reached, the group should record its choices.

Next, the group examines each Objective individually and selects Learning Method cards which identify strategies for accomplishing each one, then working through each Objective completely before starting the next one. Some may relate to more than one Objective, having chosen at least one but not more than four Methods for each Objective, the next step is to qualify whether each of the Learning Methods is teacher directed or child directed. Combining these two elements - Objectives and Learning methods - the group chooses a physical Setting conducive to fulfilling the requirements for each Objective which will best accomodate the group's intentions. The completed sets of decisions contain the necessary components to fulfill the group's planned educational program.

Graphics: Doug Gamble

POP:PLANNING OUTDOOR PLAY

David Tester and Bodil Vaupel

In an effort to facilitate a new consciousness about problem-solving and decision-making, as well as enable the transferrence of elements of the design process to non-designers, a negotiation strategy was developed. This strategy attempts to address the purpose of outdoor childrens play as being, in addition to muscle development, cognitive and conceptual development as well. This enabling aid seeks to bring groups of teachers, teacher assistants, parents groups or children together in an effort to increase their sensitivity to the nature and purpose of outdoor play and subsequently a schema for organizing equipment spatially.

Our observations of outdoor play areas, particularly associated with early learning centers, suggest two major classes of problems. The first is the limited range of outdoor facilities which address the wide spectrum of children's developmental needs. The second is a lack of awareness of teachers in associating muscle development with conceptual development. For example, climbing a ladder may reinforce the concept of "up-down" as well as nurturing large and small muscle developments. The process POP consists of a sequence of negotiation stages whose purpose is the development of a dialogue about the differences in individual perceptions and priorities. The aim is consensual agreement among the players through negotiation.

The game is planned to be played by one to five people. To begin, each player individually selects four of the most important objective cards. After each player has made his choices, the individual objective cards are pooled. Through negotiation, the group must choose from these no more than four objective cards. Players are urged to forcefully support

their individual choices, especially if other members did not make the same choice, until they persuade or are persuaded by others that an objective should be included in the final set. Next, the group examines each objective individually, and selects no more than three activity cards which best satisfy each objective. Then, the group rearranges all the activity cards so that they fit into an appropriate zone. It is important to note that not all of the zone cards need to be used and more than one activity can fit in a zone. The activities for one objective may not necessarily be in one zone. Finally, the group selects the appropriate setting that corresponds with each activity.

The set of rules is only a guide for gaining insight into the planning process; players are encouraged to change the rules in order to accomodate more specific needs.

Planning Outdoor Play has been used with various groups involved in early learning centers and in some instances as a method of organizing parents to participate in the planning and ultimately construction of children's outdoor play facilities. It attempts to provide user groups with more control over planning and design decisions and with more involvement in the chain of decision processes.

Record Sheet

Objectives

a _____

b _____

c _____

d _____

Activities

a

1 _____

2 _____

3 _____

b

1 _____

2 _____

3 _____

c

1 _____

2 _____

3 _____

d

1 _____

2 _____

3 _____

Rules

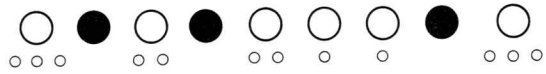
1 Pick the four (4) most important OBJECTIVES (gold cards) for your playground.



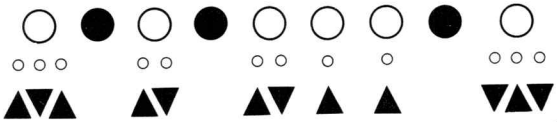
2 Select three (3) ACTIVITIES (orange cards) that satisfy the concept of each objective. Deal with one objective at a time.

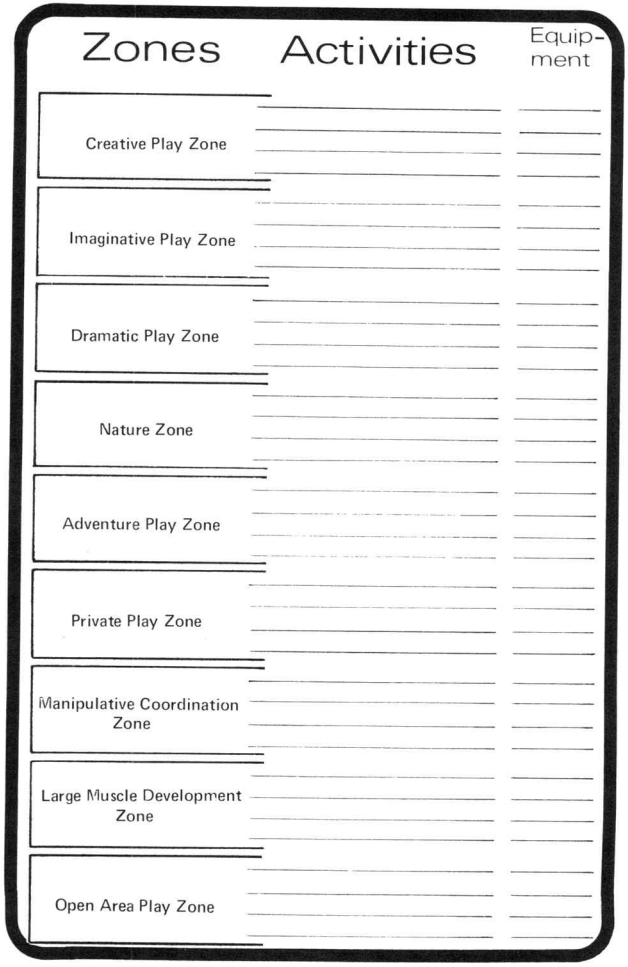


3 Place each activity in the appropriate ZONE (brown cards). You may assign any number of activities to any of the zones.



4 Choose one (1) EQUIPMENT SETTING (yellow cards) suitable for each activity.





Planning Outdoor Play

Planning Outdoor Play (POP) is a method of facilitating the design of children's outdoor play and the selection of appropriate equipment.

POP consists of four (4) sets of cards:

OBJECTIVES (gold cards) - the purpose of outdoor play.
ACTIVITIES (orange cards) - what children do outdoors.
ZONES (brown cards) - areas of related activities.
SETTINGS (yellow cards) - the equipment used by children.

The game is planned to be played by one to three people (teachers, teachers' assistants, children, etc.). To begin, each player individually selects four of the most important OBJECTIVE cards. After each player has made his choices, the individual OBJECTIVE cards are pooled. Through negotiation, the group must choose from these no more than four OBJECTIVE cards. Players are urged to forcefully support their individual choices, especially if other members did not make the same choice, until they persuade or are persuaded by others that an OBJECTIVE should be included in the final set. Use the game record sheet to report the final decision.

Next, as a group examine each OBJECTIVE individually, and select no more than three ACTIVITY cards which best satisfy each OBJECTIVE. Record all the selections.

Now, as a group rearrange all the ACTIVITY cards (twelve) so that they appear to fit into an appropriate ZONE. It is important to note that not all of the ZONE cards need to be used. Record all selections.

Finally, select the appropriate SETTING that corresponds with each of the ACTIVITY choices and record all selections.

The set of rules is only a guide for gaining insight into the planning process. Players should feel free to change the rules in order to accommodate more specific needs.

OBJECTIVES

CONCEPT FORMATION
COOPERATION
PROBLEM SOLVING
EMOTIONAL DEVELOPMENT
SELF CONFIDENCE
LANGUAGE DEVELOPMENT
OBJECTIVES
AUDIO, VISUAL, TACTILE,
OLFACTORY DISCRIMINATION
SELF MOTIVATION
SOCIAL DEVELOPMENT
INITIATIVE
COMMUNICATION SKILLS
SELF EXPRESSION
POSITIVE SELF IMAGE
PERCEPTUAL DEVELOPMENT
EXPLORATORY PLAY
SENSORY DEVELOPMENT

ACTIVITIES

MIXING
FEELING & HANDLING
HITTING
CRAWLING
SPLASHING
ROLE PLAYING
DRESSING–UP
MOLDING
BODY CONTACT WITH ANIMALS
DIGGING
CLIMBING
PAINTING
COOKING
POURING
STRETCHING
SLIDING
CONSTRUCTING
PLANTING
SWINGING
THROWING & CATCHING
BALANCING
VEHICULAR MOTION

ZONES

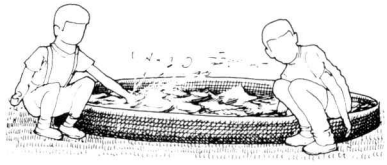
PRIVATE PLAY ZONE–Children use small protected areas for individual or quiet activities.
DRAMATIC PLAY ZONE–Children exercise their imaginations to create roles.
ADVENTURE PLAY ZONE–Children spontaneously build and rebuild their environment.
MANIPULATIVE COORDINATION ZONE–Children develop coordination skills frequently with repetitive motion.
OPEN AREA PLAY ZONE–Children use large spaces for group games and some individual activities, (which may require hard or soft surfaces).
CREATIVE PLAY ZONE–Children combine materials to make a different object.
LARGE MUSCLE DEVELOPMENT ZONE–Children overcome physical and mental obstacles, exercising all possible muscles.
NATURE ZONE–Children interact with natural objects.
IMAGINATIVE PLAY ZONE–Children exercise imagination and limited muscular effort, but no object is necessarily produced.

SETTINGS

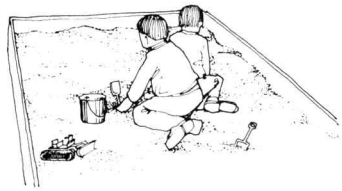
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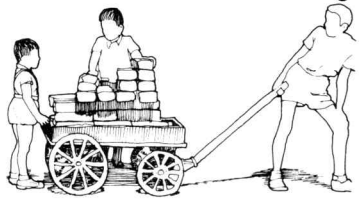
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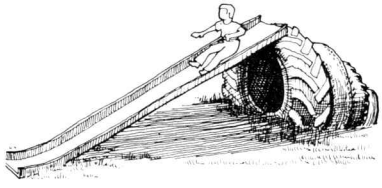
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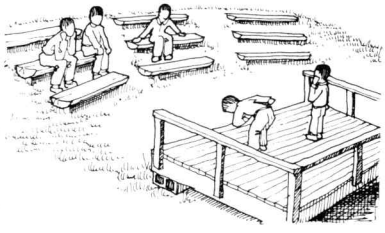
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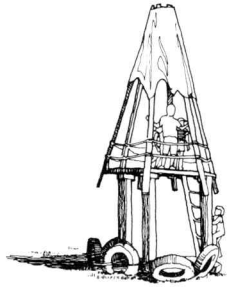
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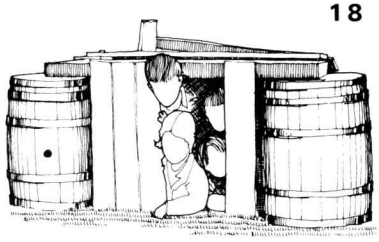
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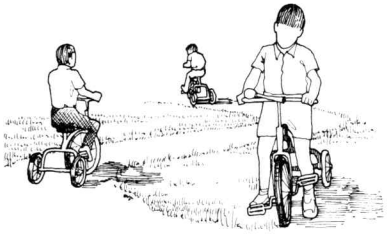
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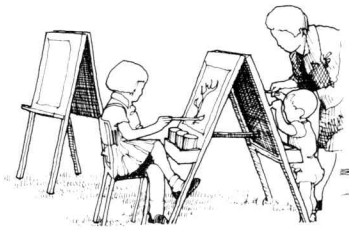
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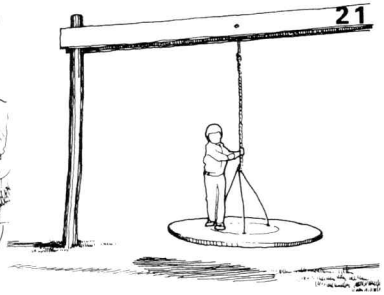
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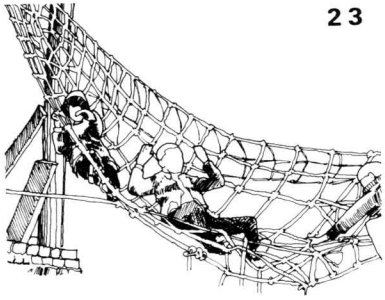
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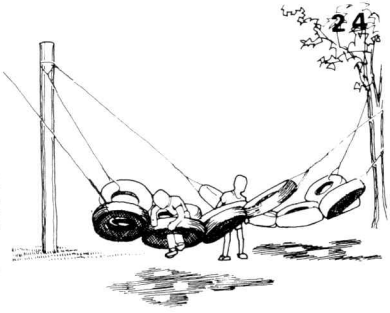
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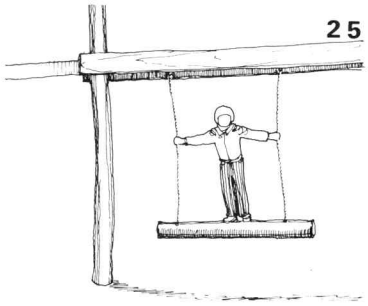


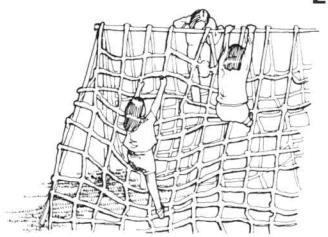
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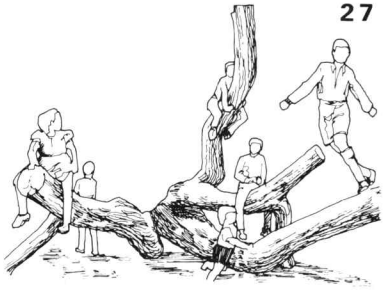


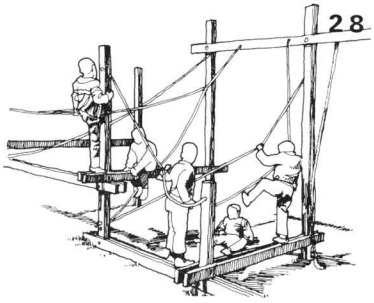
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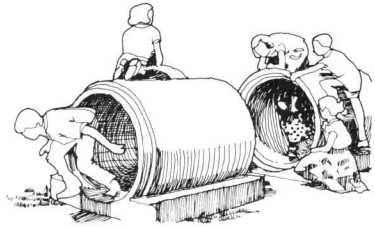

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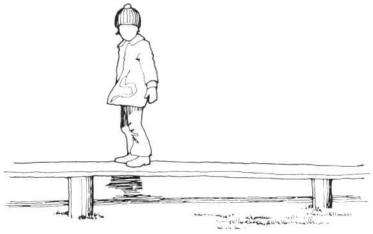

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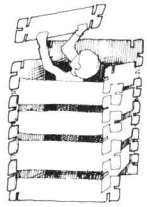

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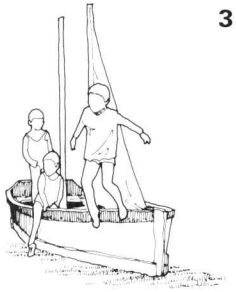

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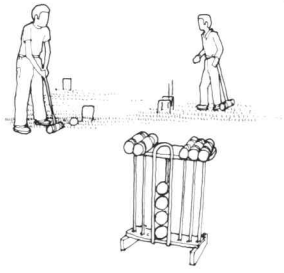

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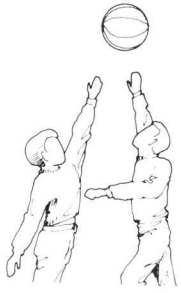

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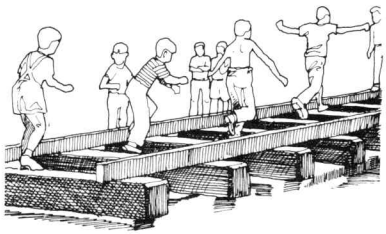

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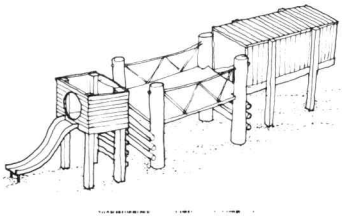
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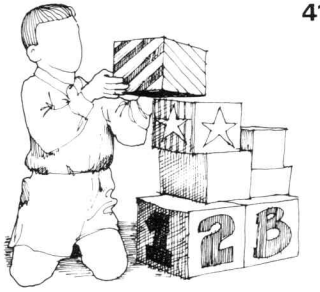
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Graphics: Mike McLeod

SEARCH—A SIMULATION: SYSTEMATIC EVALUATION OF ARCHITECTURAL REQUIREMENTS FOR COMMUNITY HOUSING

Henry Sanoff

Simulation games, those which simulate environments, are one of the most recent innovations in education. From a combination of the ancient techniques of gaming and the more recent technique of simulation, a new dynamic learning situation that abstracts the conditions of life has emerged.

Games have been developed as techniques of implementing problem solving situations and imparting information in a meaningful way. While games help to understand the complex interweaving of environmental, technological, and social forces in society, they can also be used to provide insights into situations so familiar that their characteristics are not perceived. The view shared by many in the gaming field[1] is that a game highlights the structure of relations.

The structure of relationships within the residential environment is the fundamental issue with which this game is concerned. The internal spatial arrangements of a dwelling and its relationships to visual form and intra-dwelling arrangements are inextricably linked dimensions influencing behavior and attitudes. Yet, there is a substantial lack of awareness of the impact of these relationships upon human endeavors among both designers and users.

The increased visual monotony of residential settings and the difficulty of translating survey research responses of people about their housing desires into design ideas, stimulated research into other modes and expressions of user needs and preferences. Market mechanisms suggest that housing types which sell the best continue to be produced in even greater

quantity. The fallacy to this approach to the housing market is that choices must be made between available housing, and the choice of what is available may reflect a set of compromises made by consumers, because what is really desired is not reflected in the current alternatives. This extremely conservative housing market operation inhibits innovation at many levels since the intermediaries, such as developers, mortgage lenders and public agents assume what people want.

Over the years, as families migrated throughout the United States, many carried the house style of their previous region with them to their destination. Consequently, today's examples of such relocated house styles may be found almost anywhere in the country. Furthermore, imitations of previous styles have appeared and continue to persist. In almost no other sphere of human activity has there been such resistance to change as in housing, the one area that affects us most immediately and directly. To effect change, however, is always more difficult than to continue with what has been tested and accepted.

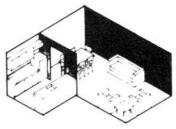
Simulation techniques can be used as an exploratory probe in eliciting responses from consumers, and exploring the decision making process used in selecting from a given range of choices of action. The Household Activities Set is an attempt to visually illustrate alternatives that may reinforce housing related attitudes.

Household Activities

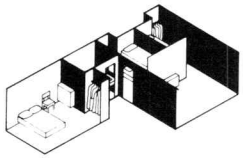
This set attempts to describe various combinatorial arrangements within economic limitations. Each choice of spatial arrangements has a point value (related to cost and area) and each player is provided with a maximum number of points to which he can allocate his choices. The classes of choices are divided into living-dining-kitchen arrangements and sleeping arrangements for children and adults. The living-dining-kitchen alternatives differ according to size and degree of separation between each activity area. The sleeping areas differ according to size and separa-

tion of adults' and childrens' areas with the possibility of an adjoining childrens' play space. By limiting the number of points, the players are forced to make decisions based on the need for privacy between kitchen, living, and dining functions or between children's and adult's sleeping areas. The total of the choices made by each player from both sets cannot exceed 68 points.

Household Activities



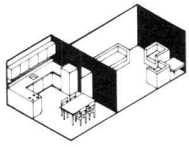
living-dining & kitchen 31



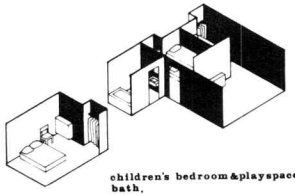
children's bedroom&playspace, bath, parent's bedroom, 37a



children's bedrooms, playspace, bath seperate parent's bedroom 37d



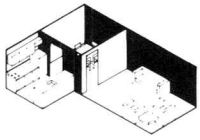
living & kitchen-dining 34



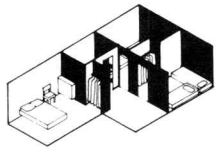
children's bedroom&playspace, bath, seperate parent's bedroom 37b



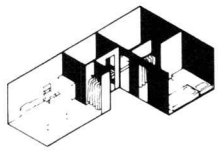
children's bedrooms, bath separate parent's bedroom 29a



living, dining, kitchen 36



children's bedrooms, playspace, bath, parent's bedroom 37c

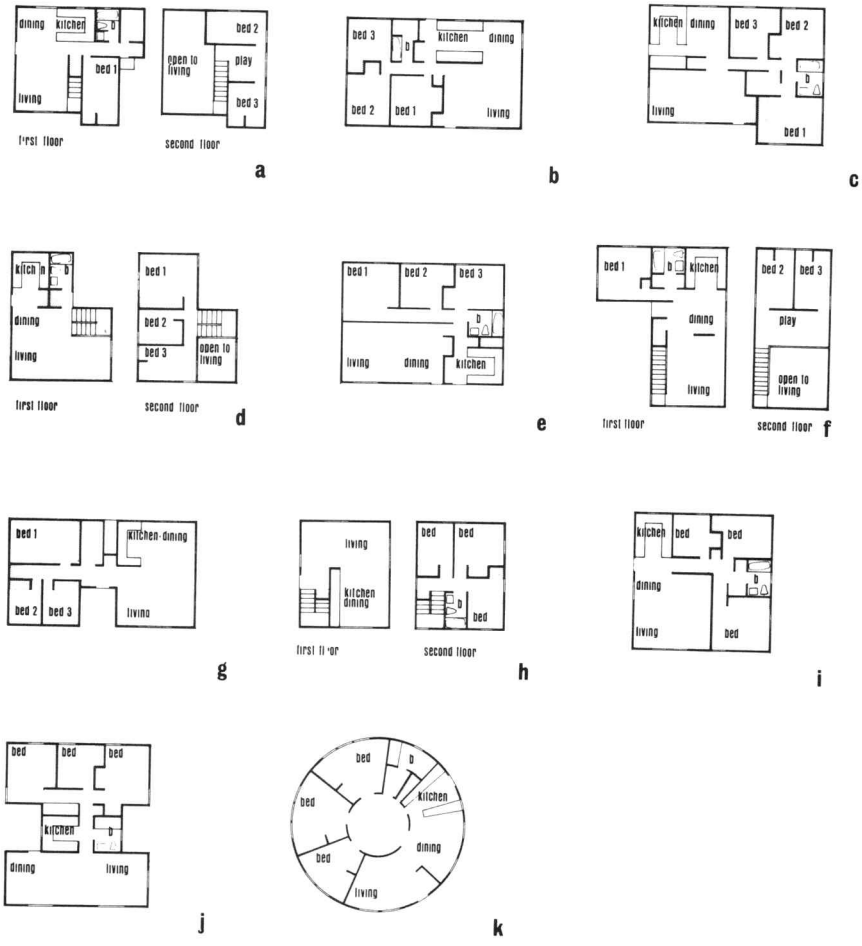


children's bedrooms, bath parent's bedroom, 29b

A third component includes the options of carport, storage room, porch or half-bath, and each player can select one from the set. This choice is usually more reflective of the players present housing deficiencies. For example, families living in housing with outdoor plumbing generally

prefer an extra storage room to an extra half bath because they assume that one indoor bath will be sufficient for their family's needs. This first stage stimulates the players awareness of the relationship between social values and behavior and location of household activity sets.

House Plan Types



Floor Plan Alternatives

Alternative planning arrangements for household activities, especially for low income families, suggests that various personal values and life styles can be accommodated by the families' habitat. The families' orientation towards centricism, leisure, convenience or prestige can successfully be accommodated by the choices provided in Set II , house plan types. The eleven alternatives are all approximately 1000 square feet in area and represent comparable construction costs.

The player is requested to make plan choices based upon each of the following criteria:

1. Best for family living
2. Best for child rearing
3. Best for entertaining
4. Best to do the things you want to

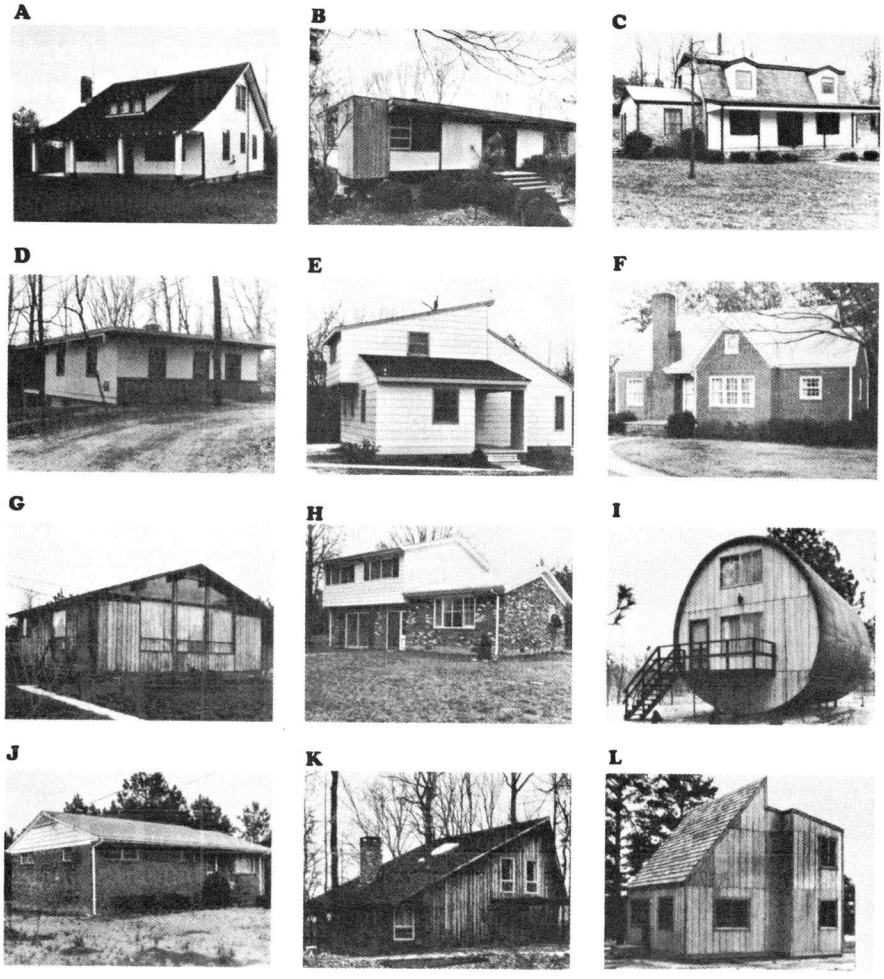
One choice is made for each of the criterion, A through C, and final overall selection is made between all the acceptable floor plans. Each decision requires the respondent to place himself in the situation and judge the attributes of each alternative based on his present and desired mode of living.

House Image

In our culture, the house is not just a structure or a shelter, but an institution, influenced by the cultural milieu to which it belongs. Therefore, the definition of the image and meaning of the house is of great importance to all people in our culture, especially those of low-income. While vernacular housing was free of stylistic interests or symbolic connotations and oriented primarily towards utility, today the symbolic meaning of the house can be directly related with users preferences and aspirations. Certain features of a dwelling, whether form, texture, novelty, or style imply a relative social status.

To this end a series of house photographs or visual displays was collected in and around the northeastern part of North Carolina, six of which were designed by architects and six which were the result of speculative development and planned by non-professionals. From the set, three can be described as typical and from throughout the region, each reflecting a different period of construction and style (A, H, J).

House Image



Previous research[2] soliciting responses from teen-agers and adults to house silhouette line drawings and photographs has indicated that preferences are largely based on previous knowledge, contact and experience. The house types generally favored by the teen-agers were those similar to the type they were occupying at the time. For adults, it varied, but usually their choices were based on what they had seen. For those respondents who favored more unique and novel house types, the differentiating characteristic was a personality measure described as environmental disposition (ED). This measure included questions related to sensation seeking, exploratory behavior and acceptance of innovation[3]. Respondents with a high index on this ED scale were more likely to select the "designed" alternatives than those with a low ED score. Our findings also indicate that urban respondents have a stronger preference for designed housing than their rural counterpart.

It has also been found that reactions resulting from direct experience with a physical environment (picture L, described by experts as novel and unique) where the respondents walked through a prototype, varied from their responses to pictures of the same prototype. Again the major differentiating characteristic was their sensation seeking level. Although through direct experience most respondents favored the dwelling considerably, those with higher SS scores showed a stronger preference for it, substantiating the relationship between high SS preference for novelty and uniqueness. While direct experience appears to draw realistic responses visual displays are the most efficient mode of representation capable of reaching the widest possible sample of consumers.

Spatial Planning

A "place centered" community is one in which social contacts through spatial proximity is considered to be a necessary condition, through sense of belonging and shared social values. For low-income communities the locus of most of the human interaction occurs in the immediate or local neighborhood.

Previous empirical studies have made an important case for the argument that physical planning is an important influence on individual behavior and social action. The issue is no longer the relative importance of the physical environment to other factors but rather whether spatial differences in the environment are related to corresponding differences in attitudes and behavior.

The way in which physical elements define or enclose exterior space as well as proximity of dwelling units to each other influences the behavioral patterns of the residents. To this end, the spatial organization set consists of twelve site planning alternatives, of varying densities and amenities. Each player is requested to select the best alternative for the following criteria:

1. Outdoor children's play areas—spaces that are organized and defined for children's use; areas free of automobile traffic and bounded for immediate parental control.

2. Inter-dwelling privacy—outdoor spaces that prevent unwanted noise from neighbors; entry locations that do not force contact.

3. Outdoor family activities—spaces that permit the family to spend time out of doors and yet maintain visual privacy, when desired, from neighbors.

4. Outdoor neighboring activities—outdoor spaces that encourage neighboring families to meet and engage in social activities.

5. Physical security—the organization of buildings and spaces that permit the residents to be seen and heard; the feeling that they are secure within their residential setting.

6. Visual appeal—the organization of buildings that permits individuality and personal identity with each family's domain; the variety in the planning and building forms.

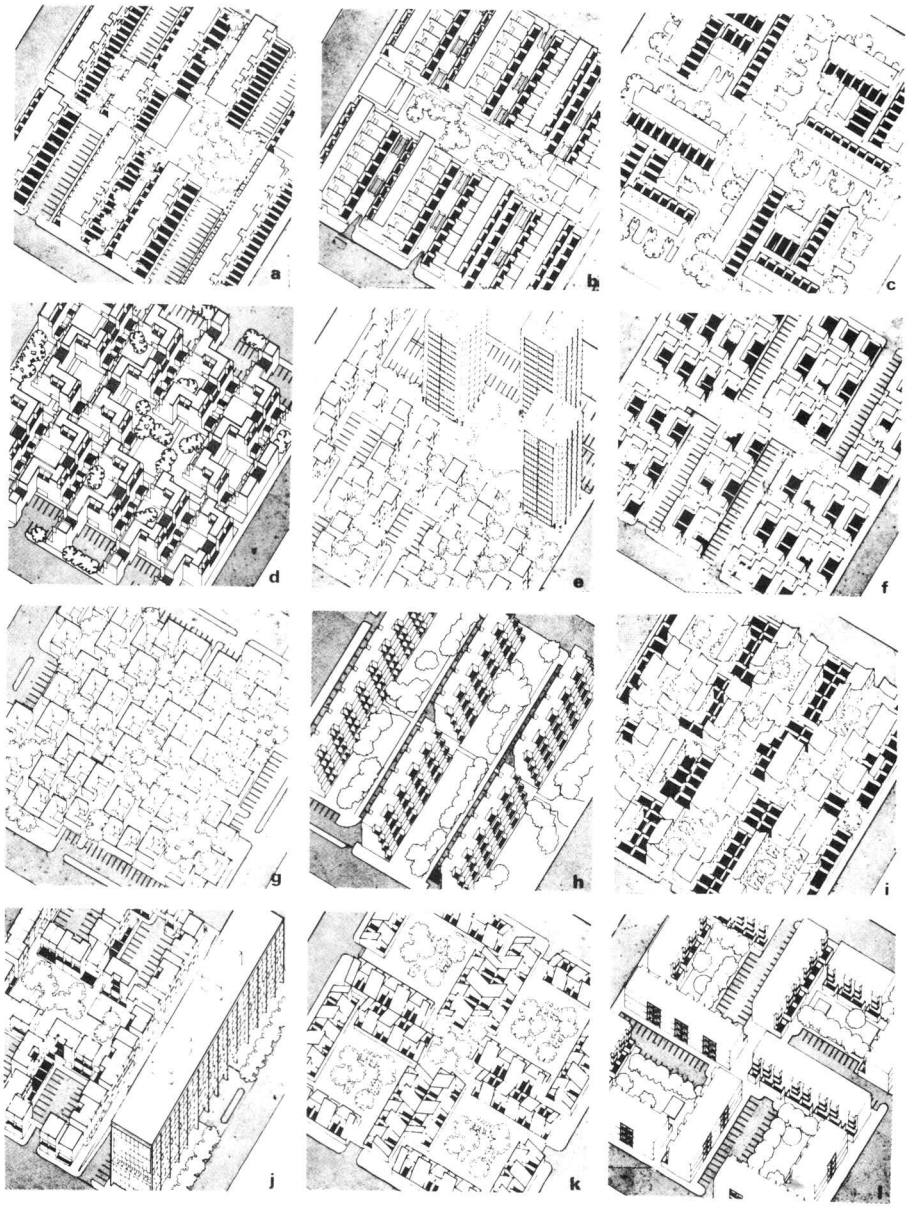
7. Best all around arrangement—the planning arrangement which satisfies most of the families' needs.

While the only constraint is that one choice can be made for each of the criteria, the player is obligated to scan the attributes of each of the alternatives prior to making his choice. This increases the respondent's level of awareness of the numerous choices of action open to him, as well as examining his behavior with respect to each physical setting.

This selecting procedure demonstrates that physical environment is not and cannot be an arbitrary action since the behavior of the user can be influenced by cues suggested in a site plan. Clearly then, the essential argument is that the consumer can begin to demand more amenities from the designed environment that are more consistent with his life style and with his stage in the life cycle.

Conclusion

The set of alternatives then - or visual displays - that forces choices from micro to macro sociophysical issues is clearly a consumer tool for advocating needs and preferences. While the choices presented are not exhaustive, they do suggest a range of conceptual alternatives that are reasonable and possible.


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b
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The displays have been employed in many diverse goal-oriented situations ranging from generating criteria for housing design to training aids for high school students. The props were used with community groups in the planning stages of public housing, planning for specific family needs, and experimental courses in architectural design for teen-agers. From the results of our contacts with various groups it has become increasingly clear that user needs research in the socio-physical environment produces findings that are predominantly user-experienced-based[4]. While it is evident that this knowledge can help to correct faulty situations or misfits that are stressful and causing mal-adaptive behavior, it does however assume design to be an error correcting process.

If the designed environment is perceived of to accomodate as well as stimulate[5] its occupants, then experimentation is necessary, particularly in those areas where innovations can accomodate desirable behavior changes. Research, then, is necessary not only in user responses to alternative environments but in modes of presentation of environmental information, response formats and dimensions of the environment.[6]

New techniques are necessary for proposing conjectural alternatives to user groups where responses need not be constrained by technical knowledge. Research incorporating environmental simulation where the user can experience new environments through video tape receivers, cathode ray tube or holography appear to offer promise for future environmental research.

Assuming the validity of the underlying theory of gaming and the relevancy of the simulations developed, gaming can have a place in formal education and training. Notwithstanding some of the apparent shortcomings of gaming simulation, properly designed games can be effective stimulus in the learning and decision process.

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* Each of the twelve drawings were reproduced from Planning and Design Workbook for Community Participation prepared by the Research Center for Urban and Environmental Planning at the School of Architecture, Princeton University, Princeton, N.J. 1969.

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