

**IMPLEMENTATION AND EVALUATION OF A MODELING APPROACH TO
COMMUNITY DEVELOPMENT PLANNING
MEETING THE CHALLENGE OF PARADIGM BREAKDOWN**

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ABSTRACT

This paper outlines the characteristics of a search process for a planning paradigm to supplant the rational approach. After a brief discussion of the ongoing debate about the shortcomings of the prevailing paradigm, the central issues and assumptions in planning method are identified. These are then used to develop a set of criteria for procedural development and evaluation to guide the search for new approaches to planning. In the first part of the paper such criteria are operationalized to develop a series of procedures and models for community development planning and measures for evaluating these are given. The second part of the paper reports on the actual implementation and evaluation of the approach as an appropriate search strategy. The context, the models, and the evaluation results obtained in two applications, Door County Wisconsin and Janesville Wisconsin, are presented. Based on these applications the potential of the overall approach as a search strategy is discussed.

PARADIGM BREAKDOWN

There is an ongoing debate in the planning profession about the shortcomings of the prevailing paradigm referred to as the rational approach, paralleling the discussions in management sciences about the problems of heavy reliance on "hard systems methodology". In both fields there appears to be a general agreement that the "normal" paradigm -which these fields share in a fundamental sense- is being seriously challenged. During the past decade we have also witnessed various responses to what some refer to as a "paradigm breakdown". These responses range from ignoring the debate altogether to proposals for alternative paradigms, none of which have gained enough support. The proper response at this stage has been identified as a search approach which addresses the central issues of the ongoing debate (Alexander 1984).

Critiques of the rational paradigm in planning has been both on normative as well as empirical grounds. While the former concerns are intrinsic to the profession, the latter arise as a result of assumptions and knowledge that planners have to rely upon, which are generated in other disciplines studying human affairs.

Intrinsic to the profession are the issues of value neutrality and difficulties in the evaluation of planning actions and policy implementation. The dilemma of ethical conduct has lead the planners to assume a value neutral stance consistent with the rational approach. Ensuing heated discussions pointing out the logical impossibility of such a stance resulted in attempts to define a scientifically defensible public interest criterion (Klosterman 1976) . Also among the early responses to this issue were substituting empirically derived values or public preferences as answers to normative questions, taking a deliberate advocacy standpoint (Krumholz 1982), and acceptance of a socio-political ideology as the basis of planning decisions, as in the neo-Marxist approaches to planning theory (Paris 1982). Planning ethics interpreted as providing equity in influencing planning decisions by facilitating wider participation of the public in decision making remains as a contentious but widely accepted view (Hague 1982, Sancar 1985).

The evaluation of policy or planning implementations presents another unresolved problem in the rational approach, mainly due to the difficulties associated with social experimentation. Again, a common response has been to augment the rational approach so that more control could be exercised in measuring the effects of the proposed solutions on the future state of affairs (Campbell 1971). This response created more ethical problems in the case of conducting social experiments where treatments to cure problems had to be essentially withheld from the control group (Mittroff and Blankenship 1973). Furthermore, evaluating results of planning based on initial predictions did not acknowledge human free will and freedom of choice to change a course of action as the initial assumptions and values changed (Checkland 1981). These realizations lead to the development of the concept of planning as evolutionary experimentation (Dunn 1971, Sancar 1977), and designing for learning systems (Sancar 1983, Sancar and Bazan 1983).

Alongside the intrinsic problems, two other major challenges to the rational paradigm came from the disciplines outside of the planning and management professions. First had to do with the lack of established theories regarding social systems which the planners have to rely upon in order to apply the rational approach. The information available to the planners at best consists of empirical regularities with competing explanations. More often than not the planner is faced with having to make defensible decisions without the benefit of established theories. As a result of this difficulty

planners began to give up the main tenets of traditional planning such as long range time horizon and comprehensiveness. Coupled with the normative problems mentioned above, this new stance lead to incrementalism (Lindblom 1979) which in turn locked planners into the status-quo. Another response has been the emergence of sectoral planning which allows the planner the comfort of emphasizing those parts of the system for which good explanations exist ("finding a lamp-post to search for the key that was lost elsewhere" syndrom).

The second major challenge came from various descriptive studies of ordinary decision making which revealed that the main assumptions of the rational approach concerning human inferences, judgements, and decision making were erroneous (Simon 1969, Nisbett and Ross 1980, Einhorn and Hogarth 1982). Furthermore, the existance of several styles of thinking (Churchman 1971, Mitroff and Turoff 1973), frames of mind (Bandler and Grinder 1982), and multiple intelligences (Gardner 1983); all equally valuable and acceptable, was discovered. While some studies emphasized the shortcomings of human inferences and judgements (e.g. Tversky and Kahneman 1981), others were aimed at discovering the heuristics underlying seemingly unstructured problem solving activities (Shon 1982, Mintzberg et.al. 1976). Planners responded to this challenge either by accommodating multiple styles of thinking or inquiry systems within the problem solving system and facilitating social discourse among competing frames of reference (Mason and Mitroff 1981), or by prescribing cognitive aids to overcome the shortcomings of unaided decision making at various stages of the planning process (Edwards 1977, Warfield 1976).

As can be seen from this brief summary, there has been a sequence of responses to the breakdown of the prevailing paradigm in planning, the rational approach, addressing a range of normative and empirical issues. While some of the responses are specific and deal with particular issues, others such as the social learning approach, or the strategic assumptional analysis, which combine a number of concerns in a consistent framework, are proposed as alternative paradigms. The consensus is that none of these alternatives have gained enough support because they are too specific, because they do not offer specific enough guidelines for application, or because their underlying assumptions are not general enough. In a recent article of the APA Journal Alexander (1984) concluded that the proper response would be a "contingent search" approach which is based on an explicit set of assumptions or a metatheory of social systems, prescriptive and descriptive interpretations, and operationalizable contingencies to guide procedural applications.

A further characteristic of such a contingent search approach readily identified upon reflection on the above account is that it needs to be "integrative." A procedural theory of planning has to be

based on the conceptual integration of various dimensions of human endeavor which are revealed in this debate, corresponding to the well known human pursuits namely; truth (the scientific), plenty (political-economic), virtue (ethical-moral), and beauty (aesthetic) (Ackoff 1975). Habermas translates these into three major categories of cognitive interests; the technical interest reflected in the empirical-analytical sciences, the practical interest reflected in the hermeneutic or interpretive sciences, and the emancipatory interest reflected in the critical sciences (Studer 1982), all equally represented in the planning paradigm debate. These pursuits form the basis of a normative theory of planning and the corresponding cognitive interests need to be addressed explicitly within a procedural theory of planning.

In the context of planning procedure, the challenge of technical interest is prediction and control, ultimately related to the generation of information useful for interpretation and criticism. The practical interest in planning is related to the judgemental aspects of dealing with multiple interpretations in a social-interactive context. Emancipatory interest justifies the integration of knowledge generation and application activities within the disciplinary realm of planning. While the ultimate aim of both activities in society is human emancipation, within the context of procedural theory this interest is translated as the unleashing of the creative potential in human consciousness and clarification of the role of critical reflection in planning. Inherent in this conceptualization is the assumption that normative guidance comes from within the system that is being planned, i.e., from the population which is affected by the planning decisions.

Given the above account of human cognitive interests and assumptions, several prescriptive guidelines for procedural design may be stated. To integrate the creative, judgemental, and purely informational aspects of a planning situation, a non-adversarial, logical, and integrative process is required. This process ought to encourage critical self-reflection based on perceived impacts of one's own decisions, it should provide information about others' values, judgements and decisions, and provide opportunity for debate.

In addition to planning proposals, an important outcome of such a process will be an enhanced understanding or shared perception of the situational context that is instrumental in making those particular proposals. To recapitulate, the main objectives of the process ought to be generation of creative options for a new systems design, facilitation of learning through search and interpretation of information concerning facts and values relevant to the situation and acknowledging possible inferential biases, documentation of the interactions among the various participants, their negotiations concerning different interpretations of reality, and how they are modified.

The approach which addresses these objectives may be further detailed by describing the human actors or participants, the model or representation of the decision environment, and the manner in which this model is developed and used by the participants. The description of these components and selection of appropriate measures corresponding to the above objectives provide the basis of the contingent search approach proposed here. In the following, this **integrative approach** (Sancar 1985) and its applications in community planning (Sancar and Cook 1987, Sancar and Martin 1986) will be presented with an emphasis on the role of modeling as a cognitive aid and a medium for capturing and documenting the perceptions and changing interpretations of the planning situation.

THE INTEGRATIVE APPROACH

Identification and organization of the human actors as the "problem solving system" (Checkland 1981) is an important aspect of the proposed approach. It is required that the participants have a real, existing, or potential interest or stake in the issue. The identification of the relevant interests will be influenced by the initial perception of the planning context. The inclusion of new participants will result in the redefinition of the problem and possible widening of the involvement.

The second component of the integrative approach, the representation of the planning situation as perceived by the participants, is the critical concept to be dealt with. This representation, which will be referred to as the "situational model," becomes the cognitive aid and the surrogate decision environment for the participants once it is constructed. The elements of the situational model are attributes of the planning context and the expected outcomes or the consequences which are the end states to be reached through the implementation of the alternatives, which are feasible combinations of various values that the attributes may take. In addition, the model also needs to contain perceived relationships among attributes and between attributes and outcomes. Since the characteristics of the completed model, its various stages of evolution, and its evaluation by the participants provide the information base for systemic understanding and procedural improvement, the situational model and the process of its design and use form the essence of the integrative approach. Among the various modeling approaches, the system dynamics methodology offers the unique opportunity for the actual application of the integrative approach (Sancar 1983). Using system dynamics, this process may be perceived as the customization of a generic model representing the system relevant to the planning context.

Here the notion of "generic model" refers to the basic structural properties of a class of systems, such as a community. A generic model structure can be developed in a number of ways. It can be based on established theory. In the absence of such a theory, it may be discovered inductively by searching for commonalities among a number of models developed by different investigators based on their own experience and common sense. However, when the system of interest exhibits low degree of entity therefore ambiguous boundaries (Dunn 1971), the corresponding models are unlikely to exhibit similar structural characteristics. This was observed in the case of system dynamics models for regional and community development (Sancar and Cook 1985a). A third way, consistent with the approach proposed here, is the evolutionary development of a generic model through successive modifications or customizations during the generation of different situational models. The main purpose of the initial generic model is to provide the planning group with a menu of conceptualizations which reflect a tentative understanding of potentially relevant subsystems.

Model customization starts with the integration of mental models of each participant into a shared structural model. This representation is used to enrich and/or change the generic model. The procedures and the representation media leading to a shared structural model and subsequent customization are based on assumptions about human thinking and interaction for problem solving. In this context the initial framing of the situation to facilitate the generation of the relevant elements of the structural model, categorization of these into subsystems, and elaboration of relationships among these, all represent important decision points from a cognitive as well as social interactive standpoints (Sancar and Cook 1985a). Similarly, during customization, the use of the structural model for evaluating the general perspective, basic mechanisms, policy choices, and time horizon; and the determination of the reference mode are guided by criteria to enhance creativity, social interaction, and avoid possible judgemental biases in information processing (Sancar and Cook 1985b). Another significant procedural decision is the representational media chosen for modeling purposes. In this approach, the importance of using both symbolic and iconic models to activate the corresponding propositional as well as quasi-pictorial image processing capabilities of participants is emphasized (Allenstein and Sancar, 1987).

The operationalization of this approach and the particular strategies and procedures used will vary depending on the circumstances and the reasons for its application. The expected benefits of the approach should be common across applications and need to be expressed in terms of measurable concepts. Such "measurements" will help generate information that is useful for understanding the relative success of the specific application and of the approach in the long run. The three concepts

that can be operationalized for purposes of evaluation are cognition, creativity, and social interaction.

Cognition is defined as the mental process involving the active manipulation of information encompassing an individual's perception, learning, memory, and thinking for the purposes of problem solving (Mayer, 1983). Direct participation in the problem structuring and manipulation is expected to improve an individual's understanding and knowledge of the issues and the problem system. The change in individuals' perceptions of the problem from a narrow to a more complete conceptualization, consideration of a larger number of variables, regard for actual base rate information can be measured by comparing the initial responses with the final model outcomes. The participants' own judgements about their understanding of situations, on the new information gained, and on the clarity of the outcomes or models also provide measures for this concept.

Creativity should be evident in both the process and the products. The essential feature of this concept is that the participants grasp previously unrelated but essential parts of a problem and see them in a new pattern. As a result, a novel and appropriate product is created and the heuristics that the group uses elicits an aesthetic response (Amabile 1983). Measures of this concept should therefore assess the solution implications at various stages of problem solving, as well as the enjoyment and the satisfaction that the participants experience from their involvement in the procedures.

In the broader sense, social participation refers to the representativeness of the participant group with respect to the interest parties. An expected result is the corresponding breadth of issues, concerns, and value dimensions represented in the models and outcomes. Within the participant group, social interaction should be facilitated for equal participation in the generation, sharing, clarification and evaluation of ideas. The expected results are increased understanding about others' concerns and satisfaction with one's own contribution to the proceedings.

The integrative approach as outlined above is currently being applied in various communities and has been evaluated using these measures. In the following two of these applications will be briefly summarized and the results of the evaluation will be discussed.

APPLICATION

The first application of the approach has been in Door County, Wisconsin. Following this experience, the procedures were modified and two other applications are being carried out presently; one in Janesville, for community development, and another in Middleton, for surface water management; both in Wisconsin. Here the first two cases where partial evaluation results are available will be discussed. The details of the procedures, the specifics of the models, and the recommendations can be found in Sancar and Cook (1986), Sancar and Allenstein (1987), Wallace and Sancar (1987), and Conant and Sancar (1987).

Case 1. Door County, Wisconsin

Door County is the Cape Cod of the Midwest, offering unique natural, scenic, as well as cultural resources for the enjoyment of the residents of the county and the ever increasing number of visitors. During the past decade the influx of seasonal residents and the accompanying increase in the development activity has caused concern over the protection of the county's resources. In response the County Planning Department launched an effort to replace the ten years old comprehensive plan. This comprehensive planning program undertaken by the Door County Planning Department provided an opportunity to test the feasibility of the integrative approach in a real-life setting. The practical objectives for county planning purposes were "...to provide public opportunity to identify issues of concern in a structured, thought stimulating format" and "... to test the accuracy of the planner's perceptions of public issues (Door County Resource Planning Committee, Resolution No.-85)." From the planner's perspective results of the structural modeling procedure was of primary importance.

The county was divided into five regions in recognition of regional differences and to minimize the distance that participants would have to travel. The participants were volunteers who responded to a newspaper advertisement announcing the start of the comprehensive planning project and asking for the representatives of various interest groups to take part in a nine-hour exercise. The participant groups ranged from six to twenty eight people in the five regions, with a total participation of sixty nine people who attended all three workshops, three hours each, held two weeks apart.

In the first workshop the groups participated in a series of individual and group exercises leading to a categorized and edited list of issues relating to the desirable qualities and resources of their

county. Each participant was given the opportunity to weight those they thought most important and to identify those whose existence they felt most certain based on availability of information. In the second workshop the participants were asked to complete a matrix which paired each issue with all others. The task was to consider each pair of issues, identify where influencing relationships exist, and determine which influence to include in the critical set. This information was used to develop a set of network diagrams showing interrelationships among all issue and problem statements for each area of the county. These issue networks were interpreted in the third meeting and the participants were asked to reformulate the major problem(s) facing the county, explain who should be responsible for its solution, and recommend specific actions. Following this task, the participants completed a second questionnaire aimed at capturing their judgements concerning the process and its results, and also collect certain demographic information.

The generic model which was constructed prior to this application consists of six major subsystems; demographics, consumption, occupancy, employment, environment, and government. Based on the interpretation of the structural models, i.e., network diagrams, a lodging sector was added to the occupancy subsystem, driven by another new sector, "visitor days." Next, the model was operationalized by initial values and by determination of functional graphs or multipliers. The modification and calibration of the generic model was carried out by the investigators whereas ideally user participation is expected to occur at this stage as well. The resulting situational model was presented to the County Planning Staff and evaluated by them in terms of clarity, breadth, and potential usefulness in aiding various stages of the planning process.

Case 2. Janesville, Wisconsin

The application in Janesville, the regional center of Rock River Valley, was initiated by the Janesville Foundation members who wanted to spearhead a community-wide discussion of perceptions, options, and ultimately converge on appropriate action recommendations for socio-economic development. A master list of one hundred and fifty potential participants was prepared by the sponsors. The list was structured so as to contain representatives of thirteen different interest groups with a range of professions, organizational affiliation, expertise, age, and income, who were invited to join the "Forward Janesville Planning and Design Group." As such, the group represented the community leadership and a good cross section of concerned citizens. A total of forty six individuals participated in four workshops during the first phase of the study leading to two structural models.

While the mechanics of the workshop procedures were similar to those held in Door County, several organizational changes were made. Here only these changes will be described. The first workshop was devoted to developing a "root definition" for the group. The root definition is a concise description of a group or an organization which captures a particular view of it (Checkland 1981). The main purpose for developing a root definition was to give the group a shared identity, a mission, some permanence, and responsibility for ownership. The description also provided an account of initial perceptions of the participants. Eight root definitions were developed in groups of approximately six people each. The analysis of the root definitions and the elements contained in them revealed that each group could be associated with one of two styles of thinking; one style mainly operating within the existing bounds and constraints of the status-quo whereas the other attempting to define an optimal or desired future state not necessarily constrained by the present. Assuming that people perform better with the style best suited to them, and that both styles are essential for successfully dealing with a planning situation, the group was divided into two, representing the status-quo approach and the future ideals approach. Each group was further partitioned to consider problems or resource-opportunities, to obtain as complete picture of the situation as possible. During the next two workshops two networks or structural models representing the status-quo and future were developed and interpreted. These interpretations lead to the formulation of a number of key questions which became the focus of the subsequent community development activities. At the end of the fourth workshop the same questionnaire as in Door County was used for evaluating the structural models and the procedures.

The second phase of the project involving the development of the situational model is still continuing. Major changes that are being made in comparison to the first application are the use of iconic models and high degree of user involvement in customization and use of the generic model.

EVALUATION AND CONCLUSIONS

The model structuring process and the network diagrams were evaluated by the participants via a questionnaire where they were asked to record their responses on a seven point scale. The questionnaire addressed the cognitive, creative and social interaction issues that the approach was designed to deal with. The results from these questionnaires indicate that as a whole the participants enjoyed taking part, were fairly satisfied with their own contributions, and found the diagrams to be understandable and clear. They felt the structural models reflected a broad outlook and a consideration for most of the relevant issues, relationships, and represented the majority of

their own personal interests as well as other interest groups within the community or county. In addition, most felt they learned about the concerns of others, about additional issues previously not thought of, and about the complex relationships existing between these. Table 1 provides a summary of these results. The responses of the Door County participants were analyzed to determine if interest group affiliation, place of residence, age, or income had any influence on their evaluations. It was found that only age had a positive influence on these judgements. Also, a comparison of participants' opinions about the importance of issues in the beginning of the workshops and the end showed that all groups placed importance to a larger number of issues and concerns after taking part in the process, confirming these results.

In comparing the evaluations of the two cases it appears that the application in Janesville was more successful in addressing the judgemental and creative aspects of the approach, while the two did not differ significantly in terms of enhancing understanding based on factual information. In Janesville participants learned more about the concerns of others and about the number and diversity of issues. They also enjoyed participating more and expressed more satisfaction with their own contributions. At this stage of the planning process, ideally the structural models ought to "imply ways of arriving at final planning alternatives", which corresponded to point four on the seven point scale relating to this question. Again, the Janesville participants perceived their structural models to do just that, while the Door County networks received a lower average score on this issue. Another difference between the two applications emerges. When the issues judged to be the most important at the beginning of the process are compared to those at the end. In Door County, while the outlooks of the individuals broadened, the relative importance of the issues did not change. In other words, issues related to environmental protection and development were still the most frequently mentioned concerns. In Janesville, however, the most important issues which were governmental services, public attitudes, employment and wages; were reframed such that at the end of the workshops, the main concerns were identified as the creation of an "image" for the community which reflects the attitudes about the past and the future, the identification of the characteristics of a "unique community center" which integrates resources of the Rock River and projects a sense of place, and identification of policy options for economic diversification. This transformation in the thinking of the participants can be interpreted as a creative act. Even though it is only conjecture at this point the author would like to think that these changes are due to the changes in procedure rather than differences in the problem context or the characteristics of the participants. This issue will be addressed in more rigor and detail upon completion of the second phase of this application.

	DOOR COUNTY	JANESVILLE
Diagrams reflect a broad outlook	5.75	5.57
Diagrams imply solutions	3.42	4.00
Diagrams reflect significant relationships	5.20	5.51
Diagram is understandable and clear	5.17	5.00
Diagram reflects the concerns of all interest groups	5.25	5.00
Diagram reflects the personal concerns of the respondent	5.59	5.46
Gained new understanding about the concerns of others	5.21	5.71
Gained new understanding about the number and diversity of issues	4.22	5.06
Gained new understanding about complex relationships	5.04	4.89
Enjoyed participating	5.75	6.31
Satisfied with own contribution	4.77	5.17

Average responses on a seven point scale

Table 1. Summary of Participant Evaluations of the Procedure and the Structural Models

The situational model developed in Door County case was presented to the County Planning Staff at a two hour session and evaluated by them with respect to clarity, breadth, and usefulness in aiding various stages of the planning process. The results of this questionnaire indicate that the three members of the County Planning Department found the structural concepts underlying the system dynamics modeling to be fairly understandable and clear and thought the modeling process to be useful for structuring debate and promoting discussion among the staff members. They also indicated that the system dynamics modeling could be useful for evaluating alternative policy proposals only to some degree since not all the relevant components were included in the model. However they conceded that the model structure could be expanded to include these additional components. The overall opinion was that the approach was a useful tool in the planning practice. The planners were also asked to judge the usefulness of the model for groups such as the County Natural Resource Planning Board, the Board of Supervisors, or the Citizens Advisory Board. Their response for all the groups was less than "to some degree", i.e., less than four on a seven point scale. Since the planners' involvement in the model customization was limited to passive reaction (they did not take part in the development of the structural model, nor in the model enhancement), this response was expected. The effect of active participation in model customization will be evaluated in the Janesville case.

Based on these applications it can be stated that the potential of the integrative approach lies in its being based on the Critical Theory of Action and the metatheory of social systems learning which provide general normative guidelines and the explicit assumptions regarding human thinking and interaction which are operationalized to guide specific applications. The particular tools designed for the implementation of the approach enhance human inferences, judgement and creativity in participating groups. The measures developed enable self evaluation. Application of the whole procedure results in a detailed documentation of the planning context including the actors, the available information and their interpretation, the procedural details, and the planning proposals thus providing a basis for social learning in the long term. As such the integrative approach appears to be a promising search strategy.

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