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CONCEPTUALIZATION FOR PLANNING AND EVALUATION

WILLIAM M. K. TROCHIM AND RHODA LINTON

Cornell University

ABSTRACT

Conceptualization is a central task in planning and evaluation. There is a need to develop conceptualization methods which can help multiple constituency groups collaborate on the development of conceptual frameworks which can guide the planning and evaluation effort. A general model for conceptualization methods is presented along with considerations for implementation. This model is illustrated in two planning and evaluation studies which involved a broad range of constituent groups within the organizations in the development of "concept maps" which could guide subsequent work. Some general implications of conceptualization methods for planning and evaluation are discussed.

Planning and evaluation are related endeavors which can be used to gain a greater understanding of an organization or a program. Both planning and evaluation involve a number of conceptualization tasks or problems. Planning emphasizes the future and consists of a determination of how the organization or program can approach that future. In planning we conceptualize the organizational or programmatic mission, goals, or objectives. Evaluation emphasizes the past and present, and involves an assessment of how a program or organization operates and what effects it may have on other factors of interest. In evaluations we conceptualize the purposes of the study, the hypotheses, the central constructs, and the key variables. All of these conceptualization tasks involve the representation of the conceptualization, usually in written form, so that others may discern the basis of the planning or evaluation effort.

Although conceptualization is generally recognized as an essential part of the planning and evaluation process, there has not been much attention directed to the development of methods for conceptualizing. To be sure, in almost any field of study one can find methods or procedures which can be adapted to facilitate conceptualization. However, even where such relevant methods are offered, they are seldom identified as "conceptualization methods" per se. To get a better sense of what is meant here by the term "conceptualization method," and of the diversity of approaches which are available, a brief survey of some relevant methods from a number of disciplines is presented.

Public policy analysts have a number of procedures which they use to help "structure" policy problems. Some of these, classificational analysis, hierarchy analysis, synectics (Gordon, 1961; DeBono, 1973), brainstorming, and assumptional analysis (Mitroff, Emshoff, & Kilmann 1979), are considered in a review by Dunn (1981). Educational theorists have been developing free-hand drawing of concept maps and the use of an epistemologically-grounded "knowledge-V" (Novak & Gowin, 1984) to conceptualize knowledge and learning. A similar concept mapping strategy, termed "clustering," has been offered as a method for conceptualizing essays and other text (Rico, 1983). Evaluators and planners have utilized a wide range of methods under the title "Delphi technique" (Helmer, 1966; Linstone & Turoff, 1975) to help achieve conceptual consensus in groups. Psychologists, system theorists, and mathematicians have developed cognitive mapping (Harary, Norman, & Cartwright, 1965; Warfield, 1976; Axelrod, 1976) to articulate and examine the causal relationships which people believe exist between concepts. Recently, several evaluators (Light & Pillemer, 1984; Cooper, 1984) have looked at how one might develop conceptual frameworks which can provide the basis for conducting meta-evaluations of prior research literature. Content analysts have developed computerized approaches (e.g., key words

Reprint requests should be addressed to Dr. William M. K. Trochim, Department of Human Service Studies, Cornell University, Ithaca, NY 14853.

in context) for extracting central themes or constructs from text databases such as field notes or case records (Stone, Dunphy, Smith, & Ogilvie, 1966; Krippendorf, 1980). There is also a long and rich tradition in measurement and scaling which uses factor analysis (Rummel, 1970); multidimensional scaling (Kruskal & Wish, 1978; Carroll & Wish, 1975; Davison, 1983); cluster analysis (Everitt, 1980; Anderberg, 1973); and Q-technique (Block, 1961) among others, to scale subjective judgments and often portray them in graphic form. Facet theory (Borg, 1979; Elizur & Guttman, 1976) is related to this measurement tradition and relies on the articulation of "mapping sentences" which describe constructs and their interrelationships. The mapping sentence is then directly transformable to a visual representation of the constructs obtained from multidimensional scaling analysis (Lingoes Roskam, & Borg 1977). Finally, recent efforts by the Joint Committee on Conceptual and Terminological Analysis of both the American Political Science Association and the American Sociological Association, have led to the development of a rule-based logical-analytical approach to elucidating social science concepts (Sartori, 1984). While all of these methods are noteworthy and valuable, they are seldom utilized in planning and evaluation for conceptualization purposes.

This paper describes our ongoing efforts to explore conceptualization methods with potential for use in planning and evaluation contexts. In the following discussion we outline a general conceptualization model, show how a specific model can be derived from this more general one, discuss two planning and evaluation studies in which this specific model was applied, and consider some of the implications of this type of conceptualization for planning and evaluation generally.

A GENERAL MODEL FOR CONCEPTUALIZATION

Conceptualization methods are specifiable, definable processes which can be used to organize thinking and to represent it for others to see. In this section, a general conceptualization model is presented and the process of implementing a specific variation of this model is discussed. It is not assumed that the models presented here are the only way to conduct conceptualization work. Many of the methods mentioned earlier offer alternative models which might also be useful.

Components of the General Model

The general conceptualization model presented here consists of several components which can be combined in various ways to yield many specific models which can be used in planning and evaluation. These components include the *process steps*, or the steps which are followed in conducting the conceptualization; the *perspective origins*, or the persons who are involved at each process step; and the *representation form*, or the final form in which the conceptualization is presented.

This conceptualization process begins with initial thoughts, intuitions, ideas, theories, or problem statements and ends with some type of conceptual representation. The term *entities* refers to each distinguishable thought or idea expressed verbally as a word, phrase, sentence, or other text unit. Entities form the basic building blocks of the conceptualization and represent the smallest unit of meaning which the conceptualizer wishes to consider in a given setting. *Concepts* may be either individual entities or groups of entities. Finally, a *conceptualization* is an interpretable arrangement of concepts and/or entities. Generally, entities are more restricted units of meaning than concepts, which are in turn more restricted than conceptualizations.

The Process Steps. The process of moving from initial entities to a conceptual representation involves the following steps:

1. *Generation* (G) of the conceptual domain. The domain is the set of the entities which are included in a given conceputalization.
2. *Structuring* (S) of the conceptual domain. Relationships between and among the entities are defined or estimated.
3. *Representation* (R) of the conceptual domain. The structured set of entities is represented verbally, pictorially or mathematically.

Each step may be conducted separately or performed together with an adjacent step. For example, when a person thinks about some topic and directly writes an essay about it, structurally it appears that all three process steps are merged into one. We indicate this in notational form by placing all three terms within parentheses, as in (GSR), to indicate that the steps are not distinguished in any structurally recognizable way. If, on the other hand, the person jots down some initial ideas in a more or less haphazard fashion (the G step), groups these in some sensible way as in an outline (the S step), and then writes the essay (the R step), we would separate the three steps parenthetically in notation form, using (G) (S) (R), to indicate the structurally distinguishable steps involved.

Perspective Origins. Conceptualizations always result from a particular perspective. For instance, the process may be carried out by an individual (i) leading to a representation which reflects that person's perspective. Alternatively, a group or several groups (g) of people may work together to develop a conceptualization. Fi-

nally, in some cases, steps in the conceptualization process may be carried out "automatically" through the use of some predetermined algorithm (a). In this last case, the conceptualization will, at least in part, reflect the perspectives of those who constructed the algorithm.

In notational form, we indicate the perspective origin for any process step by subscripting the i, g, or a to the symbol for the step. For instance, if an individual brainstorms a set of entities, we would use the notation $(G)_i$ to indicate this. Similarly, the notation $(GS)_g$ could be used to indicate that a group of people directly generated a structured set of entities, perhaps by constructing a list of ideas within several major categories of relevance.

The Representation Form. The result of a conceptualization process is a *representation*. Conceptualizations may be represented in any or all of three forms: verbal (V), pictorial (P), or mathematical (M). A written essay or outline, or an oral lecture are examples of verbal (V) conceptual representations. A flow chart, concept map, or other graph is a pictorial (P) representation. Mathematical (M) representations usually consist of a written model or formula.

In notation, the representation form is indicated to the right of an arrow symbol to indicate that it is a result of the combination of process steps and perspective origins. For example, to indicate that an individual thought about some topic and directly produced a written essay we can use the notation:

$$(GSR)_i -> V$$

If more than one representation form results from the same process we can separate the V, P, or M symbols with commas.

Constructing a Specific Model

These basic components of the conceptualization process—the process steps (G, S, R); the perspective origins (i, g, a); and the representation form (V, P, M)—can be combined in many different ways to construct different specific models which could be followed to structure a conceptualization. This is shown in Figure 1 which depicts the components in their possible combinations. The figure is vertically divided into three columns which represent the three process steps, and four rows which represent the four general classes or types of models. Each of these four model types consists of process steps carried out either individually or together with adjacent steps. In all cases, the process moves from left to right on the figure, beginning with initial thoughts, intuitions and ideas, and

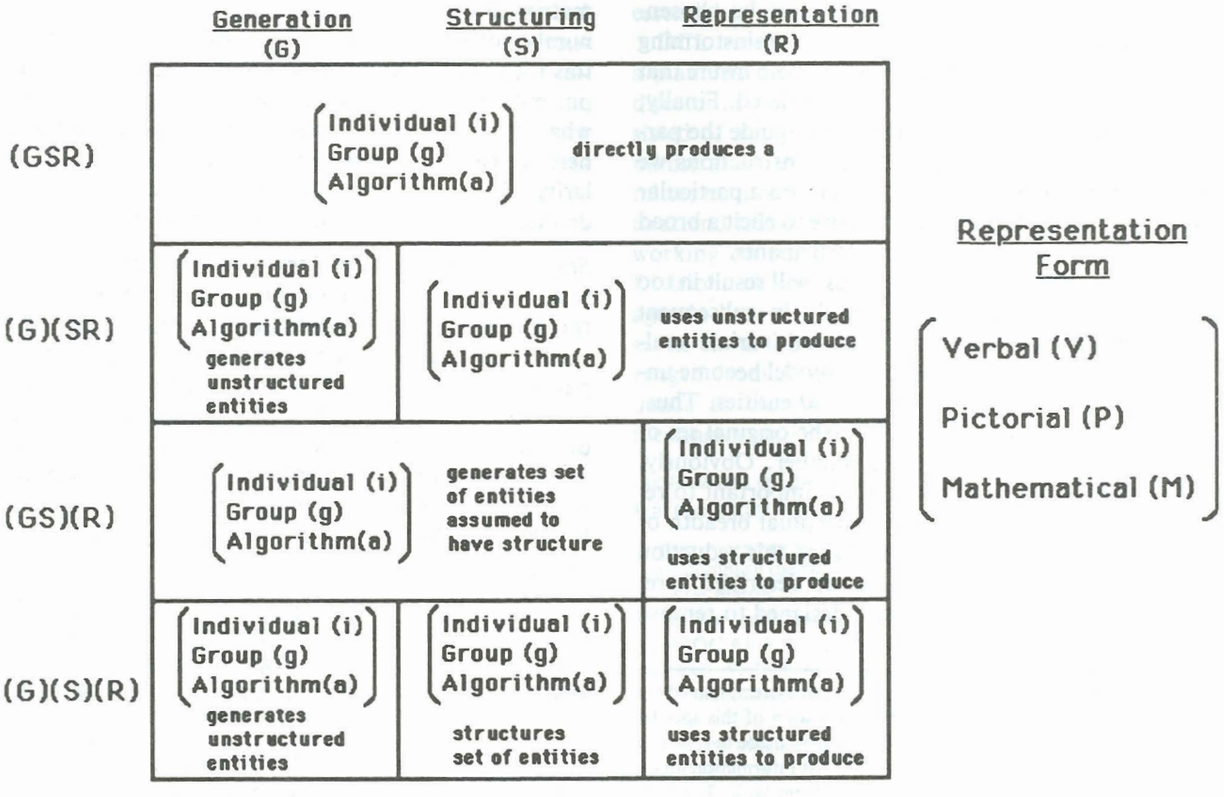

Figure 1. Conceptualization Process

ending with one or more representations of the conceptualization.

The specific model used in the remainder of this paper is represented by the fourth row of Figure 1 and can be described in notational form in the following way:

$$(G)_g(S)_g(R)_a -> P$$

Essentially this means that a group of people generate a set of entities in the first step, structure the entities in the second, and that an algorithm is used in the third step (in this case, two algorithms, multidimensional scaling and cluster analysis) to represent the conceptualization in pictorial form. The "picture" is a multidimensional concept map which shows how the groups perceive the interrelationships between the entities. In this section, we discuss each of the three process steps along with some of the considerations involved in choosing and implementing this specific model.[1]

Step 1: Generation of The Conceptual Domain (G). In this model, there are three major decisions which must be made prior to generating the conceptual domain. First, the people who will generate the entitites must be selected. They will determine the content which will make up the final product or conceptual representation. In the studies described later, we have generally tried to involve a broad, heterogeneous non-random sample of people from within the organization. Second, the entity generation method must be chosen. Typically we have used some form of brainstorming process (Osborn, 1948; Dunn, 1981) to help insure that a broad, creative range of ideas is considered. Finally, specific instructions need to be given to guide the participants in entity generation. In our instructions we have tried to balance the need to focus on a particular conceptualization topic with the desire to elicit a broad range of creative ideas from the participants.

Sometimes a brainstorming process will result in too many entities to be processed easily in subsequent steps. Our experience has been that multivariate analyses of the type used in this specific model become unmanageable with more than about 150 entities. Thus, it is sometimes necessary to reduce the original set of entitites to a more manageable number. Obviously, when reducing the set of entities it is important to retain as much as possible of the conceptual breadth of the original set. We have accomplished this reduction task in different ways in the studies described here; i.e., through a committee process designed to remove semantically redundant entities, and through random sampling of entities. The final set of entities is considered the conceptual domain for the study.[2]

Step 2: Structuring the Conceptual Domain (S). The purpose of this step is to develop estimates of conceptual similarity or relatedness between the entities. To accomplish this, we have used an unstructured sorting procedure as suggested in Rosenberg and Kim (1975). Here, each participant is given a set of cards which contain the entities and is asked to "place the cards into piles that make sense to you." It is assumed that judgments about which cards should be grouped together may be based on complex cognitive criteria and may differ from person to person. The only restrictions are that all entities may not be put in either one pile or in separate piles. After sorting the entities into piles, each person is asked to record the identification numbers of the entities by pile. For each person, an $N \times N$ binary, symmetric matrix, X is constructed from the sort information where values in the matrix represent joint occurrences such that

$$X(i,j) = \begin{cases} 1 \text{ if entities i and j were sorted into the same pile} \\ 0 \text{ otherwise} \end{cases}$$

A total matrix, T(i,j) is then obtained by summing across the individual matrices. Thus any cell in this matrix could take integer values between 0 and the number of people who did the sorting. Each value in this total matrix indicates the number of people who put entities i and j into the same pile irrespective of what the piles meant to each sorter. The assumption here is that high values imply greater conceptual similarity. This matrix constitutes the structure of the domain and is used as input to the next step.[3]

Step 3: Representing the Structured Domain (R). Two separate algorithms are used in this specific model to produce the pictorial representation, in this case, the concept map. Both take the total matrix, T(i,j), as input, First, a nonmetric multidimensional scaling analysis (Kruskal & Wish, 1978; Davison, 1983) is conducted. Examination of Kruskal's Stress Value for one through five dimensional solutions is used to select the number of dimensions for the final configuration. Kruskal and Wish (1978) describe the purpose of such an analysis:

[1]The first author has developed a microcomputer system, named the "Concept System," to facilitate the implementation of this specific method and, where appropriate, reference will be made to how this system was used to process the data. Additional information about the software may be obtained by writing to William M. K. Trochim, Department of Human Service Studies, Cornell University, Ithaca, NY, 14853.

[2]Two programs from the Concept System were used to process the entities. The first enables easy entry and editing of the set of entities, while the second formats and prints them and an assigned identification number on small index cards for use in the next step.

[3]As in the first step, we utilize several computer programs from the Concept System to enter the sorting data for each participant into a microcomputer, construct the individual matrices, X(i,j), and add these together to form the totals matrix, T(i,j) which is used as input for the next step.

> Multidimensional scaling, then, refers to a class of techniques. These techniques use *proximities* among any kind of objects as input. A proximity is a number which indicates how similar or how different two objects are, or are perceived to be, or any measure of this kind. The chief output is a spatial representation, consisting of a geometric *configuration of points*, as on a map. Each point in the configuration corresponds to one of the objects. This configuration reflects the "hidden structure" in the data, and often makes the data much easier to comprehend. (p. 7)

Second, a hierarchical divisive cluster analysis (Anderberg, 1973; Hartigan, 1975; Everitt, 1980) is conducted. This type of analysis begins by assuming that all entities are in a single cluster and then successively partitions the entities into smaller and smaller groups. The analysis is hierarchical meaning that once statements are divided into subgroups they can never be recombined again at later stages of the iterative process. A stopping rule is used to determine the number of clusters appropriate for the data (although the analysis could be carried out until each entity constitutes a separate cluster). Because the analysis is hierarchical, the number of clusters finally selected is somewhat arbitrary and depends largely on the degree of cluster generality which is desired.

The results of these two analyses (multidimensional scaling and cluster analysis) are combined in a single pictorial representation which is termed the "concept map." Each point on this map represents one of the original entities. The *location* of each point is determined by the coordinates obtained from the multidimensional scaling analysis. The *symbol* which is used to plot the point shows the cluster which the entity is in as determined by the cluster analysis.[4]

The concept may itself would be meaningless to participants without additional information which enables interpretation. Minimally, one needs an indexed concept map which gives identification numbers for each point on the map so that the individual entities can be located. Since the utility of the concept map pictorial representation rests on its interpretability, we present the results in a number of different ways (e.g., lists of entities by cluster, a cluster tree showing successive cluster divisions, a cluster map which only shows the approximate cluster locations). We then structure a group process to allow the extensive discussion and interpretation of the results of constituent groups.

EXAMPLES

In this part of the paper we use two examples to illustrate the specific conceptualization model described above. In both of the organizations involved, the conceptualization task is part of a larger planning and evaluation process. The examples are presented in some detail because it is important to document the work thoroughly, to communicate a "feel" for the process by careful consideration of the steps involved and, to provide descriptions of processes and materials which might be useful for subsequent work.

The Division of Campus Life Study

The Division of Campus Life (DCL) is an administrative unit at Cornell University which is responsible for delivering a great variety of services to the university community. It is comprised of eleven different departments[5] which vary according to size, organizational structure, kinds of professional staff, and type of service/function performed. Unified planning and evaluation is a real challenge not only for the administrative staff of the Division, but also for department directors and line staff.

As the first step of a projected on-going planning process, the conceptualization was carried out over a period of seven months from December, 1983 to June, 1984. The goal of the conceptualization process was to produce a conceptual framework in the form of a "concept map" which could be used as a central organizing device for the planning and subsequent evaluation process. Involvement of a representative group of DCL staff in all aspects of the process was considered essential by the Division administrators.

DCL administrators asked each department to form a planning committee which included the department director as one member. Typically, the committee consisted of key upper and middle-level department administrators. All of these department planning committee members were asked by the DCL administration to attend joint meetings specifically for the purpose of working on the development of future plans for the Division. The conceptualization process was the main agenda item for four such Division meetings over a seven month period. Attendance at these meetings ranged from 35 to 70 people with the average attendance in the vicinity of 45 people. Most of the meetings were three hours in length.

Generation of Entities (G). At the first meeting, entities for the study were generated using brainstorming. The

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[4]To accomplish the analysis, the Concept System was used to format the total matrix, T(i,j) which was then sent to a mainframe computer. The multidimensional scaling analysis was accomplished using PROC ALSCAL in SAS while the cluster analysis was done using PROC VARCLUS. Both programs used the total matrix as input. The concept map was produced using SASGRAPH. A more recent version of the Concept System allows the user to conduct the entire analysis on microcomputer.

[5]The departments are: Office of Assemblies; Campus Store; Cornell United Religious Work; Dining Services; Health Services; International Student Office; Public Safety; Residence Life; Office of the Dean of Students; Transportation Services; Unions and Activities.

process began with the DCL mission statement. A priori we decided that because of the number of people involved and the inherent difficulty of trying to conceptualize about so complex an organization, it would be useful to divide the mission statement into its major themes or parts and to generate entities separately with each part in mind. The mission statement (with the three separate parts italicized) is:

> The mission of the Division of Campus Life is to improve the *quality of life on campus* by *development and maintenance of an environment* that provides an opportunity for *creative interaction among all members of the Cornell Community.*

The process began by having each individual brainstorm entities for each of the three parts of the mission statement. Some general suggestions about brainstorm- were given as well as an entity sheet on which they could enter their thoughts. This individual step was included to assure that small group brainstorming sessions would have some starting point. The individually-generated items were not used in the study unless the person entered them in one of the small group sessions which followed. Three twenty-minute small group brainstorming sessions were then held, one for each of the three parts of the mission statement. The small groups were randomly assigned for each of the three brainstorming sessions, thus insuring considerable variety of group membership. Each small group elected a scribe who had the responsibility of recording the entities on large sheets which were visible to all group members. A total of 876 entities (i.e., words, phrases or sentences) were generated across the three mission statement parts by a total of 75 DCL staff members who attended the meeting.

Because of the relatively large number of entities which were generated, it was decided that the total number would have to be reduced in order to make subsequent steps feasible. This made sense especially when we considered that there was likely to be a great deal of redundancy in the 876 items because at any given time there were as many as eight separate small groups brainstorming on the same part of the mission statement. There were several principles which guided this entity reduction process. First, we wanted it to be conducted by the persons who participated in the item generation or some chosen, representative subgroup. Second, we wanted no alteration of the final selected items from their originally generated form, with the possible exception of minor typographical changes. Third, we wanted the persons who conducted the reduction to attempt to preserve as much of the meaning of the original total set as possible. A small committee was selected by the Division administrators to complete this task and they reduced the 876 items down to a final set of 137. This is the set of entities which constitute the conceptual domain for subsequent steps and is shown in Table 1 in its entirety. These entities were printed onto separate index cards along with an identification number and 60 sets of the cards were duplicated for use in the next step.

Structuring of Entities (S). This step in the process was accomplished using an unstructured sorting procedure. Each person in the DCL planning group was asked to sort the 137 entity cards into piles "in a way that makes sense to you" with the only restrictions being that there could be neither N piles (i.e., 137) nor one pile. After the sorting into piles, each person was asked to arbitrarily assign numbers to the piles and to record these pile numbers and the identification numbers of the entities which were sorted into the pile on a sheet that was provided. Finally, each person was asked to name or briefly describe each pile and to write that

TABLE 1
DCL STUDY, FINAL ENTITY SET

1. diversity of programs, services, activities, people
2. Goals and objectives clearly stated
3. more human relations workshops
4. security, safety
5. objective evaluation of programs, services, goals
6. more access board of trustees
7. intellectual stimulation
8. supportive challenge vs. competition
9. increased knowledge of university resources and locations
10. tolerance for differences
11. interdisciplinary approach to problems, program development
12. opportunities for closure—completeness, positive feedback, evaluation
13. dedicated students, staff, faculty
14. continued analysis for planning
15. financial support for innovative creative interaction
16. enthusiastic leadership
17. demands of adult development
18. listening skills
19. commitment to goals and follow through
20. recognizing need for change (faculty, staff, students)
21. academic: tutoring, centralization, variety of situations/experiences, intern/field work, international/study abroad
22. open and democratic decision making
23. recognition
24. living/learning environment—opportunities, support, residential colleges

table continues

TABLE 1 (continued)

25. relationship between academic life and overall quality of life
26. human needs: creative, caring, honest, tolerant, flexible, sensitive, considerate
27. cultural activities: concerts, plays, news/periodicals, roundtables/forums, artistic/plastic
28. friendships—fun
29. size (number of students, staff, cars, paper)
30. facilitate exchange of ideas and staff values, ideas, opinions, things, etc.
31. identity (individual and group)
32. technologically current state of the art
33. top down/bottom up interaction
34. facilities
35. consistency
36. student interns
37. sense of structure
38. beauty/aesthetics
39. guidance with students emotional/mental problems
40. social and recreational opportunities
41. identify, promote and maintain what works well
42. people get freed from 'everyday' roles to think differently than usual
43. experimentation
44. more residence halls
45. must have clarity of goal for interaction to produce creativity
46. free expression
47. promote accountability and responsibility
48. goal conflict can inhibit communication and creativity
49. responsibility
50. maintain environment conducive to personal growth and development
51. ethnic foods
52. self discovery
53. reduction of stress
54. faculty in residence
55. freedom of movement
56. who defines what is needed/evaluates?
57. CU support experimental community arts
58. athletics
59. humanized technology
60. actively encourage input from subordinates
61. outreach(ing)
62. simplicity and directness of language
63. creativity in use of geographic area
64. productiveness
65. concern for the individual
66. promote use of environment beyond classroom
67. career development
68. grievance procedures (all complaints)
69. eliminate deadlines when possible; minimize unreasonable deadlines; balance time pressures
70. self governance
71. integration of on campus and off campus community
72. planning which involves those who are affected
73. sense of humor
74. incorporation of adverse opinions
75. reward initiative and efficiency
76. time for reflection
77. continual review of facilities and programs; maintain and productive
78. discussion of quality of life
79. sharing
80. recognize we all contribute to education
81. time for development of system: planning, evaluation system
82. study
83. strategy to link lofty concepts to what we do day to day
84. creative use of communication devices and technology
85. active moral commitments
86. encourage interdependency among departments/too much separation
87. formulation of inter-divisional committees
88. involvement
89. improve 'environment' for staff
90. means of converting ideas into action
92. encourage small group activities
93. no empire building
94. life-long learning
95. improved parking
96. sufficient and adequate space for facilities
97. spirituality
98. actively promote the good citizen/C.U.
99. scholarly discussion of moral and ethical issues
100. sense of worth
101. master plan for construction, maintenance, services
102. common learning core curriculum for the campus community
103. affirmation
104. determine what are the 'real needs' of students and work toward meeting them
105. collaborative problem solving
106. address alcoholism, drug abuse—isms (diseases of society)
107. develop governance/judicial system which reflects 'real world'
108. intentional interactions, i.e. roundtable discussions of issues
109. preventive health care program
110. creative development and use of money
111. respect for confidentiality
112. employment/volunteerism
113. ecology—relationships: academic, social/moral, recreational
114. create quality circle
115. tolerance for ambiguity
116. long range vision
117. encourage teaching by non-faculty
118. transportation
119. role models for diverse populations
120. create real roles for student government
121. absence of loneliness
122. style/lightness of touch
123. more integrated use of dining facilities
124. sense of participation and control
125. commitment to excellence—facilities, programs, people
126. considerate behavior—courteous, non-exploitive
127. broad range/diversity of choice—academics and services
128. understanding and appreciation of different values, mores, customs
129. institutional commitment to: faculty, students, staff
130. development of life coping skills—shopping, budgeting, decision-making
131. reduction of environmental health hazards
132. empathy
133. honesty, openness
134. promote sense of community
135. network development
136. nurture service orientation
137. permission to fail

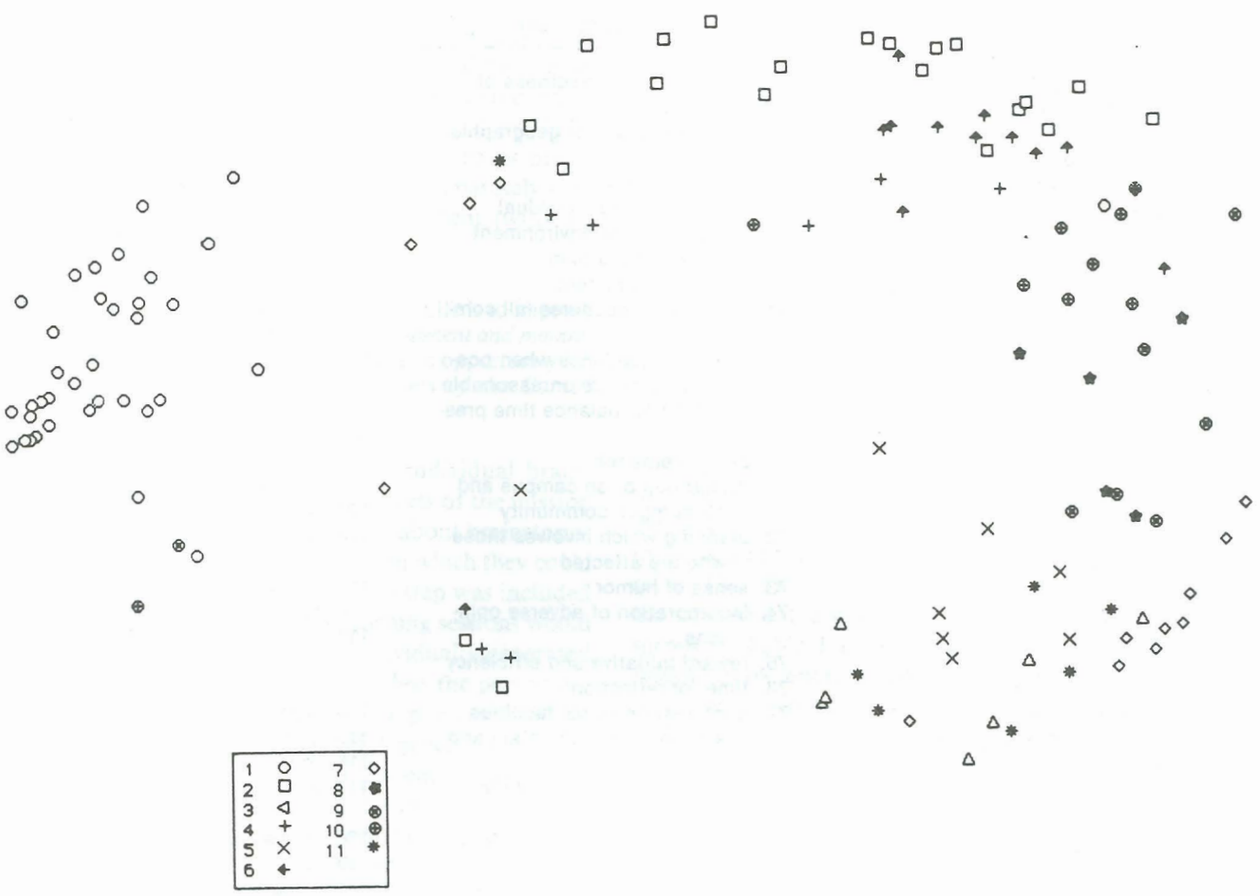

Figure 2. DCL Concept Map.

information on another sheet.[6] A total of 43 people participated in this step.

For each person, a 137 × 137 binary, symmetric matrix, X, was constructed from the sort information as described earlier. A total matrix, T(i,j) was then obtained by summing across the individual matrices. Thus any cell in this matrix could take integer values between 0 and 43 (in this case, 43 people sorted the entities) where the value indicates the number of people who placed the i,j pair in the same pile. This matrix constituted the structure of the domain and was used as input to the next step.

Representation of the Structured Domain (R). The concept map was produced by combining the results of multidimensional scaling and cluster analysis as described earlier. A two-dimensional solution was chosen for the multidimensional scaling and eleven clusters were identified in the cluster analysis. The concept map is presented in Figure 2. Again, note that the *location* of each point is determined by the multidimensional scaling whereas the *symbol* used to plot the point indicates which cluster each entity is in.

A third meeting of the DCL planning group was held for purposes of interpreting the results of the study. Participants were given a list of the original 137 entities grouped according to cluster. This list showed the entity, identification number, and the correlation between the entity and its own cluster. Each person was asked to read through the entities and to attempt to name or briefly describe each cluster, recording their responses on a sheet that was provided. Small groups were then randomly formed in which individuals discussed and came to agreement on names for each cluster. Finally, in a general session, each small group gave its suggestion for cluster names and the entire group discussed and came to agreement on one name for each cluster.

Each participant then entered the cluster name in the appropriate place on a cluster tree. This tree represents the hierarchical cluster analysis results and is shown, along with the final cluster names, in Figure 3. Discussion was held about the meaning of the cluster tree and

[6]This information was not used directly in this study. However, in another conceptualization study (Linton, 1985) a method was developed to analyze similar information to help arrive at final cluster names.

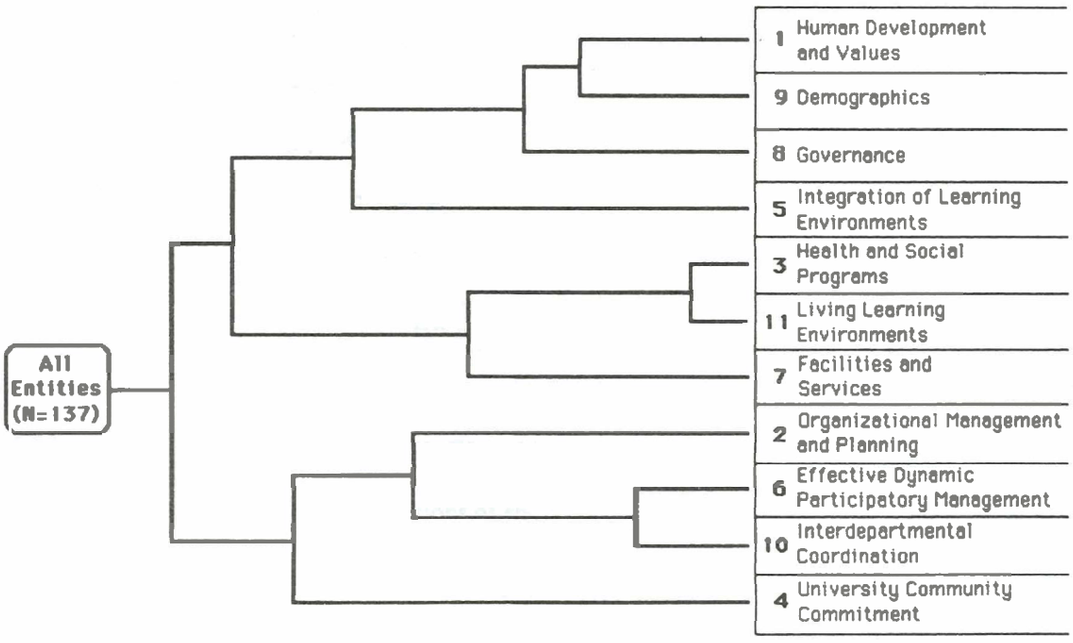

Figure 3. DCL Cluster Tree.

minor revisions to cluster names were made. A more detailed version of the map, termed the "indexed concept map" (Figure 4), which shows the exact location of each entity by identification number was then presented to enable a better linkage between the interpretation of the map and of the cluster results.

A fourth meeting of the entire DCL planning group was held to continue the interpretation. The first task involved looking for regions (or "clusters of clusters") on the concept map. To do this, participants were given a "cluster map" which showed the approximate location of each of the eleven clusters on the concept map. As in previous meetings, the process which was followed involved identifying regions first on an individual basis, then in small groups, and then through agreement by the whole group. Each region was then named or characterized in much the same way as the clusters had been. The final cluster map with cluster and region names is shown in Figure 5. Given this new context for meaning, cluster names were open for revision, although none was made.

The remainder of this meeting was devoted to examining potential uses of the conceptualization for the DCL planning and evaluation process. To begin, a set of questions (Table 2) was given which asked participants to think generally about the meaning of the concept map. Then, in an attempt to encourage the participants to develop their own schema for interpreting the map, two alternative representations were given. The first is termed the concept matrix (Figure 6) and shows a 2 × 3 classification of the clusters. This matrix was developed by examining the map and trying to interpret dimensions. For instance, examination of the entities moving from west to east on the map seemed to indicate that they changed in nature from more global value statements to more specific issue statements and finally to even more specific objectives and activities. Similarly, when entities are read moving from north to south on the map there seems to be a change from process oriented items (perhaps interpretable as more "managerially" oriented) to entities which reflect outcomes (or perhaps, services). Thus, the concept matrix can be thought of as a structure which can be overlaid onto the original concept map. The concept triangle shown in Figure 7 was developed in a similar manner. Here, the original concept map was turned on its side because it seemed to make sense that the more general, value-oriented statements which predominated in Cluster 1 belonged on top of more specific items. Similarly, the distinction between management and services, which was noted above in reference to the matrix, was formalized here by assigning the bottom two corners of the triangle to these categories. The cluster names were located along this triangle in roughly their original position on the concept map. Both of these interpretations (Figures 6 and 7) were given as "suggestive" devices designed to stimulate thinking about the organization and its planning and evaluation process. Perhaps as important was the desire to encourage participants to recognize that they could and should actively manipulate the map or any other representations until they were satisfied with

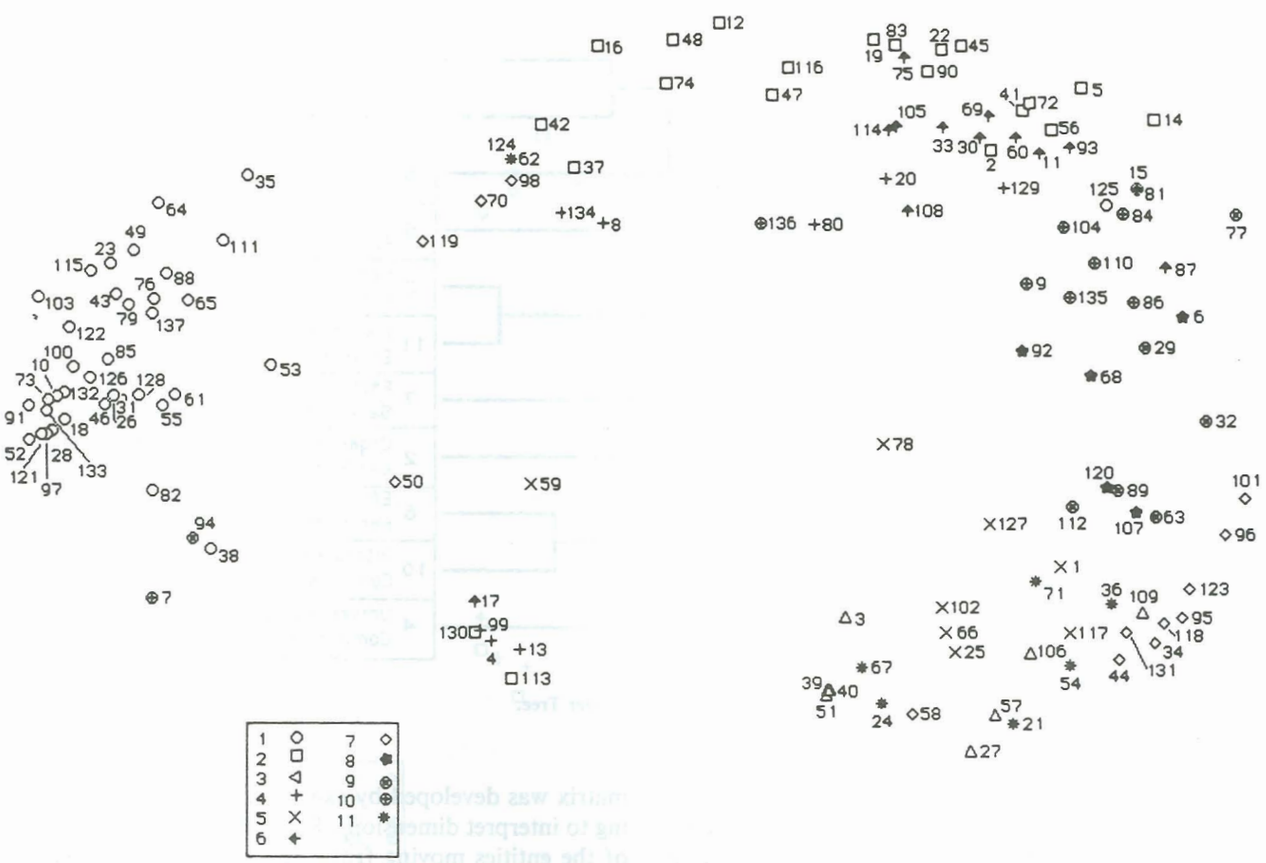

Figure 4. DCL Indexed Concept Map.

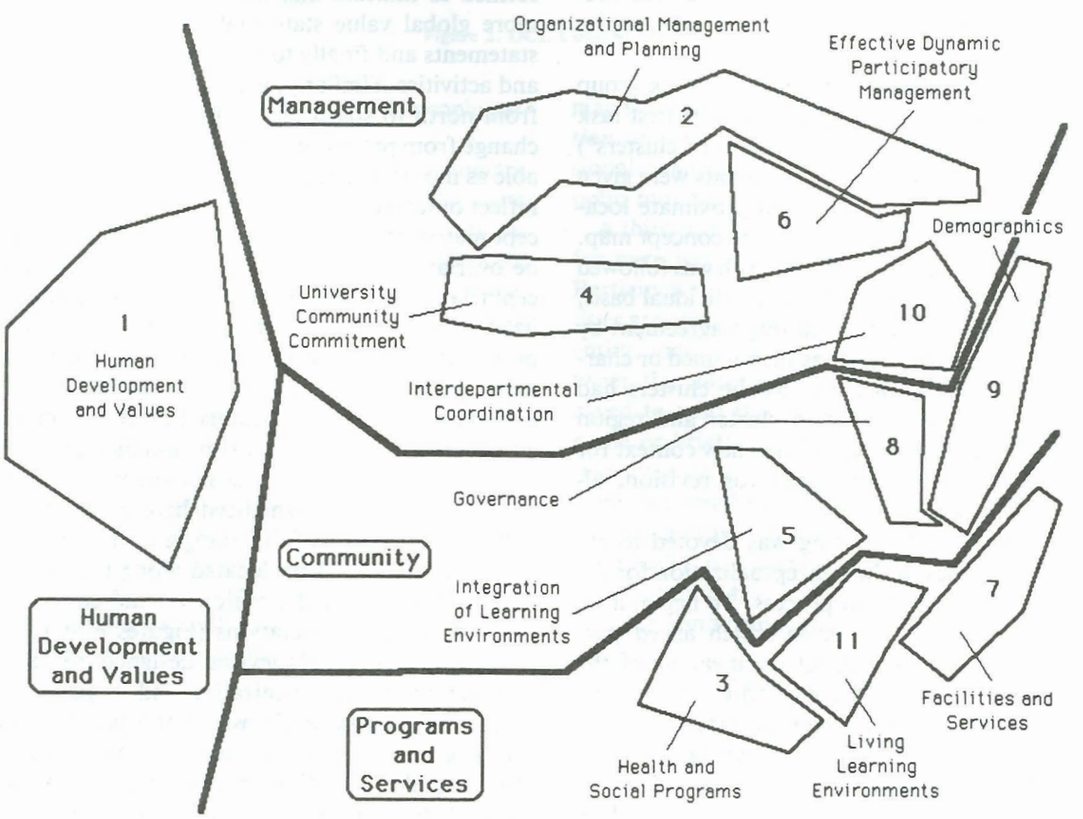

Figure 5. DCL Cluster Map.

TABLE 2
DCL STUDY, QUESTIONS FOR INTERPRETING THE CONCEPT MAP

At this point, the formal conceptualization task is complete and we can begin the job of interpreting the conceptualization and determining how it can be used in the Divisional planning process. First, we will examine the concept map itself. Each small group should discuss the map, considering the following questions:

- What is this a conceptualization of?
- Are there some regions or clusters which are more important than others?
- Are there major topics of relevance to the Division or your department which could not be located sensibly somewhere on this map?
- Do the issues in some regions or clusters have to be addressed *before* issues elsewhere can be?
- Are there certain regions or clusters which constitute *strengths* of the Division or your department?
- Are there certain regions or clusters which constitute *weaknesses* of the Division or your department?
- Are there certain regions or clusters which act as *links* between other regions or clusters?
- What, if anything, does the concept map imply about *goals* of the Division and of your department?
- What, if anything, does the concept map imply about *planning* in the Division or for your department?

them—even to the point of moving the locations of entities or clusters on the original map. Thus, the concept map was not portrayed as a fixed or final statement about the "true" thinking of the DCL group, but rather as an initial and tentative representation which had potential suggestive power and organizing capability.

To illustrate how the concept map could be used to help organize the planning process itself, we attempted to address a major problem—the development of a common reporting format for the departments. Given the variety among the departments, the Division needed a format which would preserve this variety and still enable interdepartmental comparisons. We began by looking at the concept map and the four regions which had been identified by the group. These were easily transformable into an outline as shown in Table 3. Similarly, the concept matrix suggested two outline forms (depending on which dimension was given hierarchical preference) as shown in Tables 4 and 5. Any of these, and perhaps others, might be useful as general outlines which departments could follow in reporting to the Division. Alternatively, these could be used as the basis for discussion of more detailed or differently-structured outlines. The final task which the group undertook was the discussion of how to begin using the results of this conceptualization within the context of their individual departments. A list of questions (Table 6) was provided to stimulate the discussion and move the overall DCL planning process toward

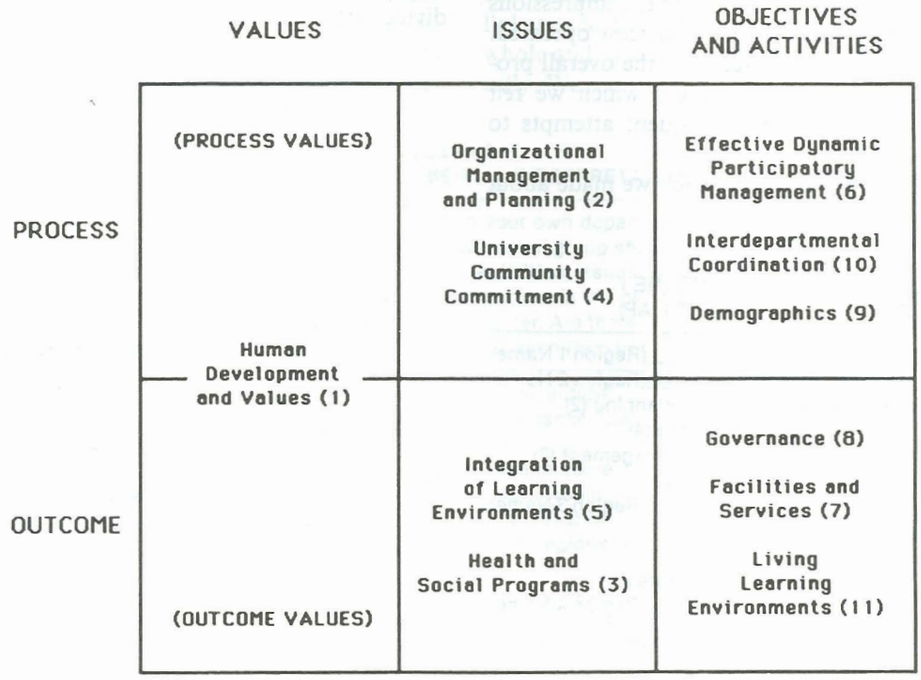

Figure 6. DCL Concept Matrix.

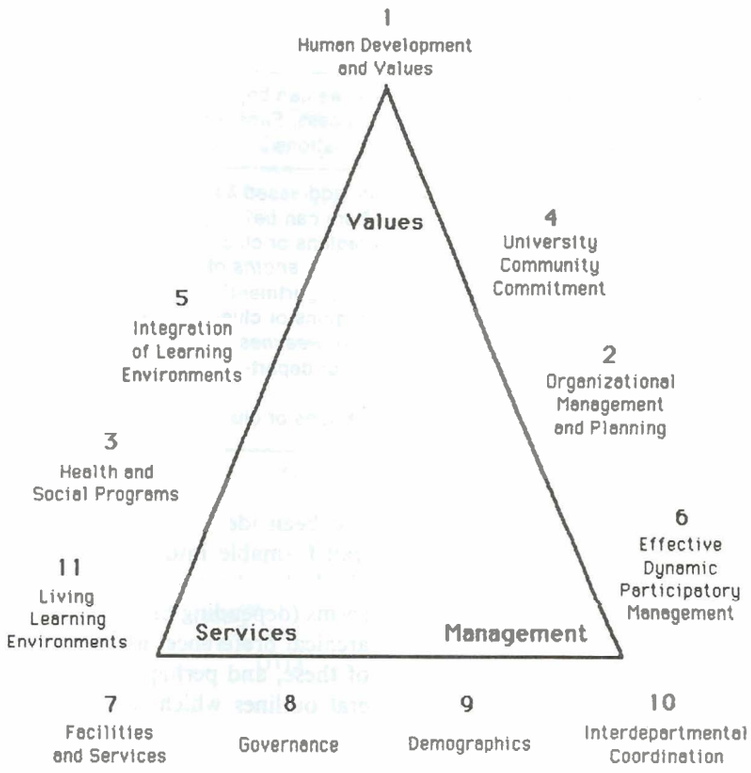

Figure 7. DCL Concept Triangle

the next step which would focus more on department activities.

Impressions. Before proceeding to the second example it might be useful to describe some of the impressions which we had about how the DCL process operated. While we were generally pleased with the overall process, there were three problem areas which we felt needed improvement in any subsequent attempts to apply this approach.

First, several of the decisions which we made about how to handle the entity generation and reduction may have had some limiting consequences for the final product. For instance, our decision to use the DCL mission statement as an organizing device and then to divide this statement into three parts probably affected

TABLE 3
DCL STUDY, SAMPLE OUTLINE I
(BASED ON DCL CONCEPT MAP)

I. _____(Region 1 Name)
II. _____(Region 2 Name)
  A. Organizational Management and Planning (2)
  B. University Community Commitment (4)
  C. Effective Dynamic Participatory Management (6)
  D. Interdepartmental Coordination (10)
III. _____(Region 3 Name)
  A. Demographics (9)
  B. Governance (8)
  C. Integration of Learning Environments (5)
IV. _____(Region 4 Name)
  A. Facilities and Services (7)
  B. Health and Social Programs (3)
  C. Living Learning Environments (11)

TABLE 4
DCL STUDY, SAMPLE OUTLINE II
(BASED ON DCL CONCEPT MATRIX)

I. Values
  A. Human Development and Values—Process Values (1)
  B. Human Development and Values—Outcome Values (1)
II. Issues
  A. Process Issues
    1. Organizational Management and Planning (2)
    2. University Community Commitment (4)
  B. Outcome Issues
    1. Integration of Learning Environments (5)
    2. Health and Social Programs (3)
III. Objectives and Activities
  A. Process Objectives and Activities
    1. Effective Dynamic Participatory Management (6)
    2. Interdepartmental Coordination (10)
    3. Demographics (9)
  B. Outcome objectives and Activities
    1. Governance (8)
    2. Facilitities and Services (7)
    3. Living Learning Environments (11)

TABLE 5
DCL STUDY, SAMPLE OUTLINE III
(BASED ON DCL CONCEPT MATRIX)

I. Process
  A. Process Values—Human Development and Values (1)
  B. Process Issues
    1. Organizational Management and Planning (2)
    2. University Community Commitment (4)
  C. Process Objectives and Activities
    1. Effective Dynamic Participatory Management (6)
    2. Interdepartmental Coordination (10)
    3. Demographics (9)
II. Outcome
  A. Outcome Values—Human Development and Values (1)
  B. Outcome Issues
    1. Integration of Learning Environments (5)
    2. Health and Social Programs (3)
  C. Outcome Objectives and Activities
    1. Governance (8)
    2. Facilities and Services (7)
    3. Living Learning Environments (11)

the types of entities which were generated during brainstorming. A careful examination of the concept map shows that the entities on the left tended to be more general in nature than entities on the right. But the left-side entities also tend to be shorter, most of them are single words. The key question here is whether the participants sorted the entities more on the basis of meaning or of word length. If we had used a single brainstorming organizer (or none at all) the entities might have naturally been more similar in structure thus minimizing the likelihood that the structural characteristic was more salient than the semantic one. In the DCL situation we ultimately combined entities generated from all three parts of the mission statement. However, it seems possible that participants generated more general (or more single word) terms to the "quality of life on campus" prompt than to the "development and maintenance of an environment" one. Whatever the case, it is clear that the question of focus and the specific instructions given at the entity generation stage of the conceptualization can have a fundamental effect upon the outcome. Another problem related to the generation of the entities involved the way in which the orginal set of 876 entities was reduced to 137 final items. Although the use of a committee to perform this task may be appropriate, in some ways it leaves the key decision-making criteria at the subjective level and reduces the overall accountability of the process.

A second problem area in the DCL process concerned the length of time involved. The entire process was spread out over seven months. By the time the group reached the interpretation stage there was some evidence of restlessness and desire to move the planning along to more task-oriented work. In addition, the long periods between meetings seemed to have the effect of minimizing the carry-over from one session to the next. People appeared to have some difficulty in comprehending where we were in the process and why. Perhaps more important, they often seemed to forget what had been done at the prior meeting and how they felt about it. By the time we began the interpretation stage, the interest of some participants had already passed.

This leads to the third major problem area in the DCL conceptualization. There was far too little time for interpreting the results and making the cognitive linkages to the planning and evaluation process as a whole and to what the departments were doing specifically. We took almost an entire two-hour session simply

TABLE 6
DCL STUDY, QUESTIONS FOR DEPARTMENTAL INTERPRETATION OF CONCEPT MAP

In order for you to take advantage of the concept map within your own department, you have to become fluent at moving from the map to the individual brainstormed items. To begin, each small group should select a region and a cluster within that region to concentrate on. Consider your department—it's goals, activities, issues. What does the region mean for your department? How important is the region to your department? How important is the cluster which you're considering?

Now examine the complete set of brainstormed items for that cluster. Are there any items which you would *add* to this list in order to make it more appropriate for your department? Consider each item in turn and discuss the following questions?

- Is the item relevant to your department?
- What specific activities do you have which address this item?
- If the item implies some goal, what specific actions might you take to address this goal?
- If the item implies some action, what would the consequences be of taking such action?
- If you address the item in some way in your department, would your actions have any effect on issues implied by other regions or clusters?
- If you address the item, would your actions be related to what is going on in other departments or the Division as a whole?

You should certainly feel free to add any other questions to this list which occur to you. Then repeat this process with a different cluster selected from a different region. Is this procedure useful as a basis for a structured discussion within your department?

trying to agree upon names for the eleven major clusters. This is not to say that the naming task is unimportant or should be shortened. On the contrary, we would argue that it is a central part of the interpretation of the results. Unfortunately, this part of the process took so long and was so involving that people were somewhat fatigued and sufficient attention was not given to looking at the concept map, matrix, triangle, and other interpretative materials which might have led to a better sense of closure for the group.

As of this writing, the DCL planning effort has moved past the initial conceptualization stage. During the past year a planning subcommittee developed an initial five-year plan which will be reviewed by the entire Division. The conceptualization effort appears to have had two major effects. First, it did provide some structure for the subsequent work of the planning subcommittee. The group divided into several smaller working groups on the basis of the tri-corner classification of the concept triangle. Recommendations which they developed in these three areas were in part drawn from the original set of entities and from recommendations generated by the departments which were based on the clusters. Second, although it is difficult to document, it appears that the process of conducting the conceptualization may have had important unanticipated side effects, especially on factors related to group cohesiveness. At the beginning of the planning effort, the departments tended to think autonomously. There was little sense of what the Division was. The recent report of the planning subcommittee, however, emphasizes divisional cohesion and stresses the value of the mission statement when interpreted in real contexts which departments encounter. While this increased divisional sense cannot be attributed to the conceptualization alone, it is clear that that process was a factor in its development. This new sense of Divisional identification received added confirmation in a recent (early June, 1985) personal conversation with the Director of the Division.

The University Health Service Study

The University Health Service (UHS) study grew out of the DCL study described above; UHS is one of the eleven DCL departments. The UHS representatives to the DCL planning group participated in the DCL conceptualization and felt that such a procedure had potential value for their organization.

From the beginning, however, there were some important differences between the two conceptualizations. First, a major goal of the UHS process was the involvement of all of the approximately 100 staff members including maintenance staff, physicians, clerical staff, nursing staff, and administration. Second, we decided at the outset that the brainstorming procedure would be set up with more focused instructions concerning the types of entities which were desired. Third, in addition to information about the relationship between entities, the UHS wanted some estimate of the priority of each entity for planning purposes. Finally, we had to complete the entire process, from the initial brainstorming to the final interpretation of the concept map, within a four week period during May of 1984.

Generation of Entities (G). The brainstorming was accomplished in three sessions over three successive days. A total of 77 people participated (26 on 5/8; 26 on 5/9; and 25 on 5/10). The participants were told to "generate statements (phrases or sentences) which describe your view of what the University Health Services *should be* or *should do*." Thus at the outset the conceptualization was focussed on planning for the future. Each person was also given a copy of the UHS mission statement and goals although they were not required or encouraged to use these in any way. A total of 315 entities were generated. The final set of entities was obtained by selecting 100 entities randomly from the generated set. The UHS administrator responsible for the project then examined this final set to see whether it seemed representative of the larger domain. No changes were made as a result of this examination. The final set of 100 entities is shown in Table 7 in its entirety. These were printed on index cards along with their identification number and duplicate sets of the cards were made for use in the next step.

Structuring the Entities (S). As above, an unstructured sorting procedure was used to accomplish this step. Each person was asked to sort the entity cards into piles "in a way that makes sense to you." The results of the sort were compiled into a 100 × 100 binary symmetric matrix based on joint occurrences of entity pairs and the total matrix was obtained by summing across individual matrices. This matrix constituted the structure of the domain and was used as input to the next step. In addition, each participant was asked to rate the priority of each of the 100 entities on a 5-point scale ranging from least important (1) to most important (5).

Representation of the Structured Domain (R). Essentially the same analysis was used as for the DCL study, that is, both multidimensional scaling and hierarchical cluster analysis. Analysis of the results of the hierarchical cluster procedure led to the selection of twelve clusters. The concept map is shown in Figure 8. As before, the *location* of the point on the map was determined by the multidimensional scaling while the *symbol* for the point was determined by the cluster analysis. Figure 9 shows the index map with each of the entities indicated by identification number. A hand-drawn cluster map was used to indicate the approximate positions of the clusters.

The final meeting involved approximately 45 UHS

TABLE 7
UHS STUDY, FINAL ENTITY SET

1. UHS should be supportive to staff
2. better time management
3. Drug and Alcohol abuse counselor
4. healthcare for staff and family
5. improve the public image of UHS
6. provide high quality health care to students and staff
7. expand in health education efforts
8. expand services for faculty, staff, and family in a bigger building
9. increase cont. med. ed. for nurses
10. promote increased educational opportunities for staff
11. more acknowledgement of staff accomplishments; more positive feedback
12. discourage non-emergency visits to clinic during non-appointment hours
13. discourage number of x-rays ordered and lab work ordered
14. decreased time spent at lunchtime meetings
15. less committees with more efficiency
16. interrelating with other campus organizations
17. more integration among all UHS staff
18. find ways to increase staff morale, especially during burn-out times (e.g., end of year crunch)
19. reduce missed appointment time
20. open to families of staff and students
21. expanded laboratory services
22. preventive medicine on out reach programs (i.e., vaccination clinics)
23. centralized dictation available to everyone in building
24. Team approach to seeing patients—assign patients to team by alphabet
25. more effective scheduling of clinic hours
26. who are our patients?
27. increase population?
28. provide pediatric care with expanded staff
29. centralized dictation for charts
30. limit costs for students
31. less pressure on staff
32. better communications among UHS departments
33. lunch hours without meetings
34. improve transfer of medical records—decrease lost charts, decrease misfiled lab slips
35. better orientation for new staff
36. increase sense of responsibility toward one's job
37. implement new system to give lab results
38. prompt attendance (staff, clients, etc.) at work and meetings
39. promote more 'positive image' for UHS
40. more interdisciplinary involvement
41. more rigid adherence to ONU (overnight unit) purpose
42. more staff, less workload
43. more availability of journals, books, etc.
44. more follow-up re: patient care/outcome
45. re-evaluation of shifts
46. more minorities on medical/nursing/support staff
47. prompt services
48. encourage students to take responsibility for their own health
49. more staff availability to answer client questions
50. more staff availability to answer client questions
50. continuing education for staff
51. student advisors to UHS
52. improve floor plan—direction to various departments
53. improve system for dispensing medications
54. staggered lunch hours to allow UHS to be open at noon
55. provide best total health care with minimum inconvenience to staff and students
56. better advertisements for faculty/staff about services provided
57. assure confidentiality
58. expand preventive health care teaching to the Cornell Community
59. get more employees and students involved in decision making process
60. create more 12-month positions and less 9-month positions
61. stay open during lunch hour
62. be sensitive to the people we serve (e.g., international, minority groups, etc.)
63. financial aid for needy patients
64. increase parking spaces for patients
65. clinicians should be more aware of students' lack of time for waiting for care
66. eliminate private physicians
67. clinicians should instruct patients better on policy and procedures
68. longer lunch hours (one hour minimum)
69. increase educational activities
70. increase staff in Psych. Service
71. develop self-care cold unit
72. fewer hassles from administration
73. provide better soundproofing in therapy rooms in Psych Service
74. more openness re: salaries
75. offer all clinic services to staff as well as students
76. increase computerization
77. responsive to ethnic/language problems
78. develop patient bill-of-rights
79. have a fast, same-day low wait service
80. increase maintenance staff to improve upkeep of building
81. have CGSS rely less on volunteer help—would be better if a regularly employed health assistant was present (volunteers are unreliable, work-study isn't much better).
82. promote salary equity—new employee vs. old employee
83. prompt in meetings
84. have a night custodial and maintenance crew when ONU is open
85. expand services
86. provide OB/GYN care for spouses
87. extend service hours
88. increase appointment times for patients (longer appointments)
89. make building bigger and add staff
90. updated equipment
91. staff morale—positive stroking
92. utilize more 12-month staff when possible
93. provide continuing education for all staff with full cooperation of administration
94. better computer system: a) more cross-training on computers, b) more access to computers by staff
95. provide adequate patient parking
96. provide dental care

table continues

TABLE 7 (continued)

97. provide consumer education	99. more interactive with other areas of the university (e.g., nutrition, housing, dining)	100. promote more liaison between clinic personnel and academic departments
98. foster student responsibility for their physical and mental health		

staff members and was devoted to the interpretation and anticipated utilization of the results. The group went through a process which led to a consensus on names for the clusters (as in DCL this involved first small group and then whole group discussion) which were then written on the cluster map. Following this, the group considered whether there were any sensible regions on the map. They agreed upon and named four general areas. The cluster names, region identifications, and region names are filled in on the cluster map shown in Figure 10. Note that the group placed one cluster (Cluster 5: Health Education) simultaneously in two regions—campus-community relations and client services.

At this point the group was divided into small groups and given the task of generating specific recommendations for action (action statements) for different regions and clusters within regions. To accomplish this, they made use of the entity statements within each cluster and of the average priority rating for each entity. The discussion was very lively and 145 action statements or recommendations were generated. These then formed the basis for consideration of actions on the part of the UHS planning committee.

Impressions. Our overall impression was that this study worked better than the DCL processs. Specifically, in this example the set of entities was more homogeneous

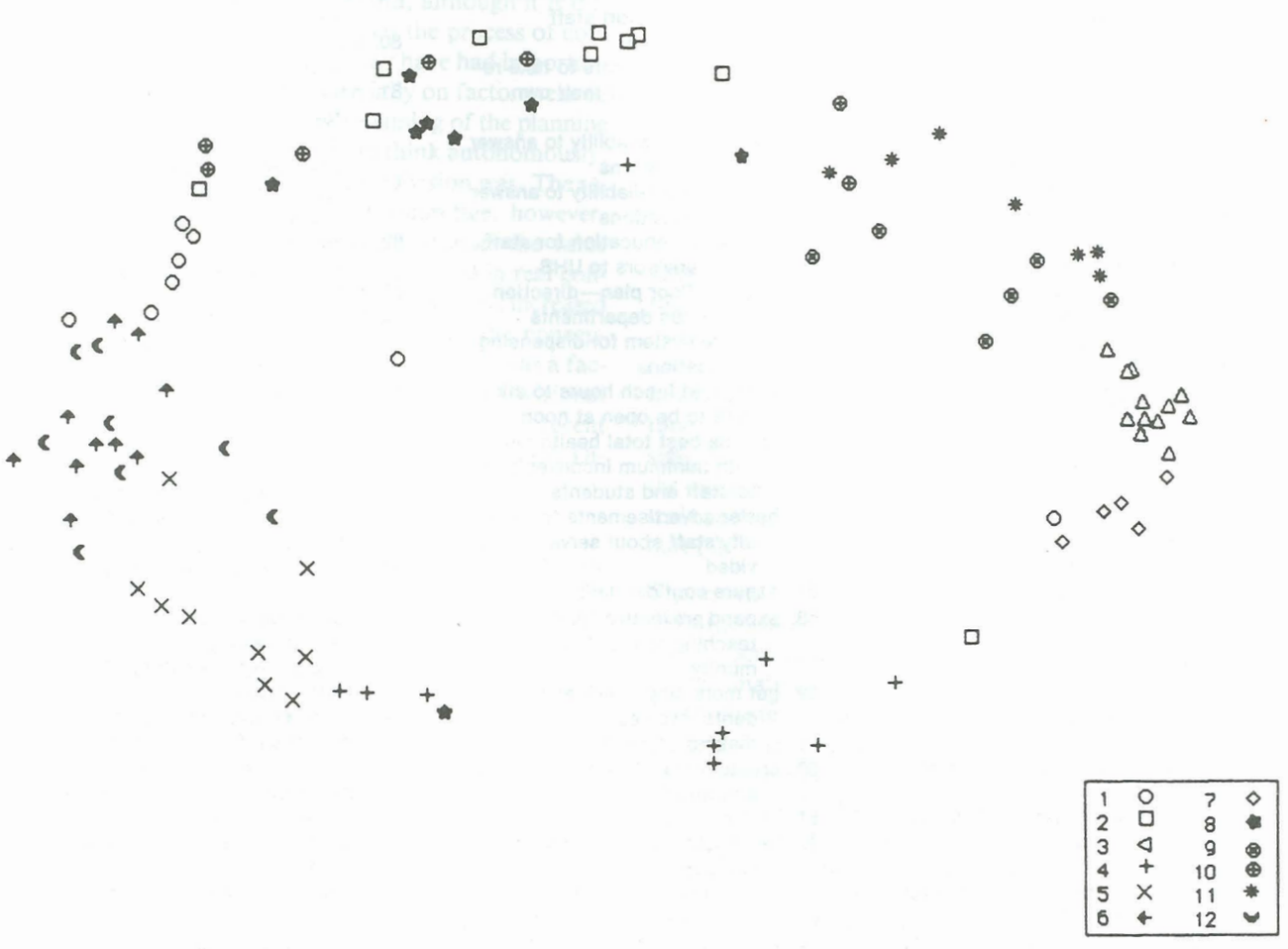

Figure 8. UHS Concept Map.

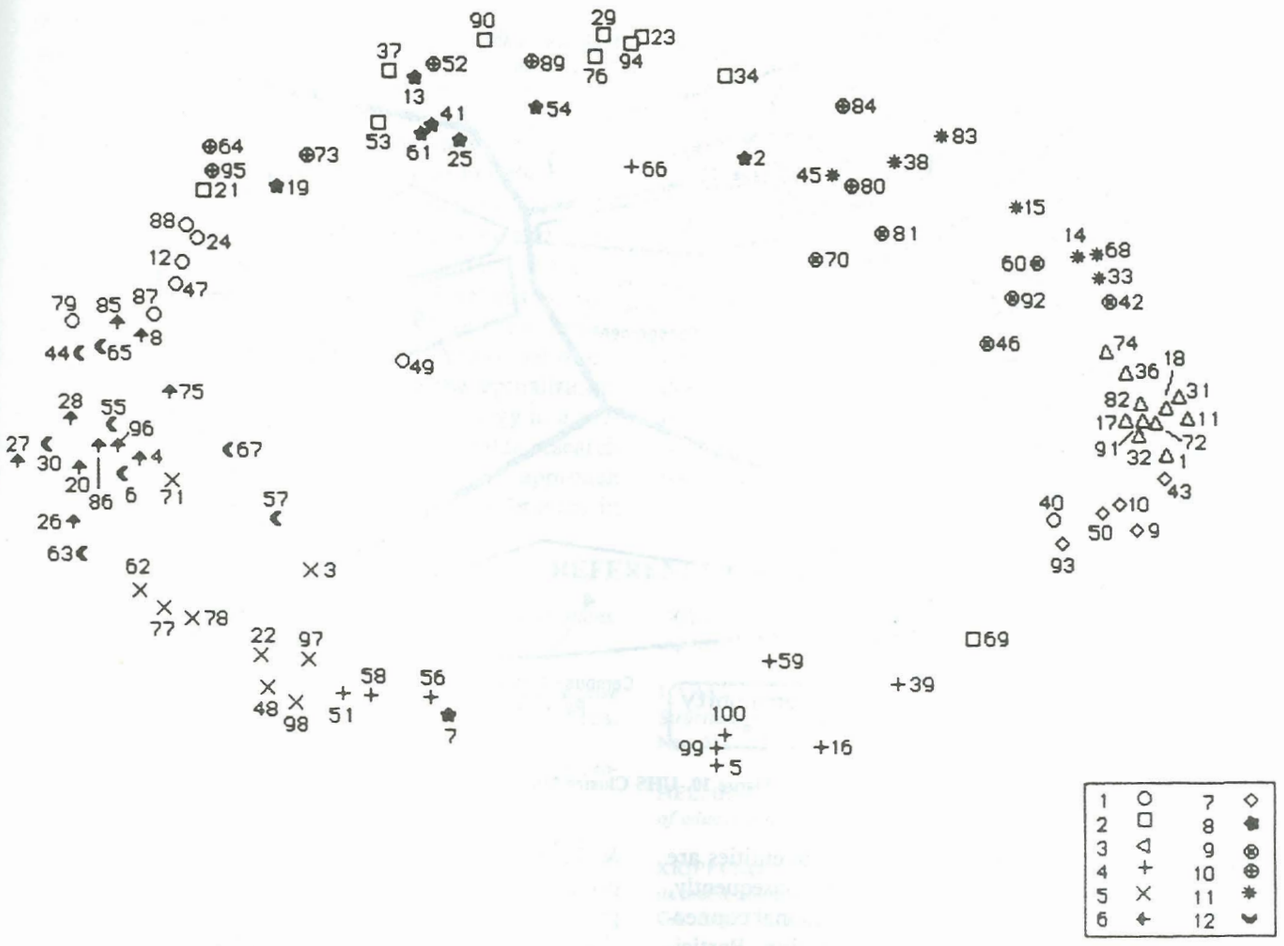

Figure 9. UHS Indexed Concept Map.

in nature (probably due to the nature of the brainstorming instruction) and tended to represent recommendations or actions which might be taken; the process was accomplished in a much shorter period of time and consequently there was less frustration and fatigue and more carry-over of enthusiasm; and, the emphasis on action statements based on clusters and regions appeared to provide a sense of closure and accomplishment. The UHS planning process is an ongoing one. At this time, approximately one year later, the administrator who is responsible for the process has reported that the planning committee has responded to each of the 145 action statements which were based on the concept map, with either action taken or reasons given for why action is not desirable or possible.

CONCLUSIONS

Several conclusions can be drawn concerning the use of the specific conceptualization method described in the examples above. First, it is a goal free process (Scriven, 1983). There are no predetermined hypotheses or structured instruments to delimit the questions being investigated prior to participant involvement, leaving the definition of such boundaries up to them. Second, this method of conceptualization combines a creative, opening, divergent way of thinking with a categorizing process; it both expands and contracts the conceptual content. Third, the conceptualization process is a "responsive" one (Stake, 1983). It places power over the content primarily in the hands of those it affects. The brainstorming and sorting steps allow for input from all participating individuals. Researchers make relatively few subjective decisions throughout the process and have virtually no control over the product. Fourth, the concept map depicts the relational data in its entirety, simultaneously showing individual entities, clusters of entities and both of these levels in relation to each other and the whole. Interpretation of this type of relational data encourages synthesis across different

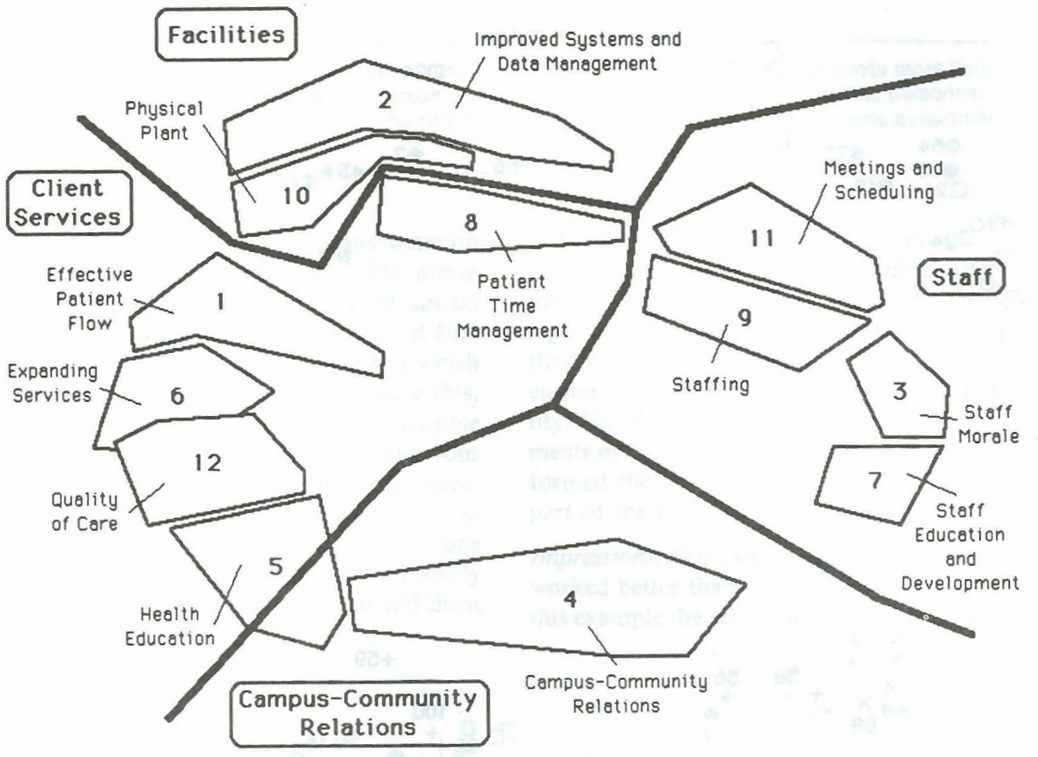

Figure 10. UHS Cluster Map.

levels of conceptual meaning. Finally, the entities are individually identifiable on the map and, consequently, each participant is able to maintain a personal connection to the meaning of the conceptualization. Participants not only see the items which they generated, but also see them in relation to all other items—they can begin to see where they fit into the whole.

Conceptualization methods in general appear to have several important organizational side effects. The intensive interaction of staff around a common theme which is encouraged by these methods may have a unifying effect. The process promotes creative thinking which simultaneously includes issues relating to specific everyday job activities as well as to the broader purposes and structure of the entire organization. The sorting procedure forces a creative juxtaposition of ideas or entities which might not typically be thought of in relation to each other. These methods create a focus on process which may be generalized to either continuation of current efforts or transferred to other contexts. They introduce a common language across possibly heterogeneous and contentious constituent groups. These important organizational effects suggest that the conceptualization process may even be more important than the final representation itself. Such a view is consonant with the thoughts of planning theorists who hold that "although plans are valuable, the planning process itself is more important" (Reinharth, Shapiro, & Kallman 1981) or that "the process of planning is probably more important than any document or plan produced" (Bean & Kuh, 1984).

Conceptualization methods and their outcomes have important implications for organizational planning. The creative expanding nature of the processes may be especially appropriate to the needs of planning work. Involvement of a variety of constituent groups contributes to a broadening of perspectives as well as to concrete suggestions for changes by those most clearly involved with the everyday functioning of the organization. The outcome or representation form, especially if it is pictorial, can provide a concrete framework within which to explore various possible plans, problem resolutions or combinations of actions for the future. Recommendations can be generated which address specific areas of the concept map by region, cluster, or individual entity.

For evaluation, conceptualization processes may be valuable for conducting internal organizational analysis, that is, to gather information about the current state of the organization from a variety of perspectives, including all aspects of its operation. They seem especially useful in revealing the informal side of the organization through its process. They can facilitate the development of reporting forms and procedures to reflect accurately the processes and outcomes of the organization. The representation can be used as a

framework for decision making or to suggest where additional formative or summative evaluation might be undertaken. Individual entities or clusters of entities can be adapted for use in constructing questions for surveys. In cases where entities show similarity by appearing not only close to each other but also in certain patterns (e.g., simplex, circumplex), subscales may be constructed directly with little or no additional preparation. Identical conceptualization processes could be carried out among several groups or subgroups and maps could be compared for their similarity or differences. If restricted to a common set of entities, one can even conceive of using conceptualization methods as part of a data collection strategy in a pre-post or multiple group quasi-experimental research design (Trochim, 1985). Essentially this approach would involve looking for changes or differences in patterns rather than in univariate or multivariate indicators.

Conceptualization methods provide structured, replicable and accountable ways for groups to conceptualize. Both the final representation and the effects of the process itself can be useful to an organization engaged in planning and evaluation work. Such processes, of course, are not without their costs. For instance, conceptualization methods as described here require considerable time and group effort. However, experience in implementing such methods and improvements in the computer programs which are used has reduced these costs considerably. More empirical work is needed if we are to understand better the relative strengths and weaknesses of conceptualization methods for different planning and evaluation contexts.

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