GROUP COMPOSITION IN URBAN PLANNING:
Single Discipline Research and Design / Interdisciplinary Research and Design

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Abstract
The efficacy of a multidisciplinary group is mediated by a number of factors including personality, intellectual functioning, group size, leadership and group composition. In urban planning, many groups must be multidisciplinary but little is known as to how to select a group, its component disciplines, its probability of successful research and design and goal-policy evolutionary tendencies. The purpose of this research was twofold: (a) experimentally manipulate one of these variables -- group composition -- in an attempt to determine its effects on the functioning of multidisciplinary urban planning; (b) to suggest further research which needs to be conducted to better estimate the overall efficacy of the multidisciplinary research and design strategy.

Statement of the Problem
Many urban planning efforts in both research and design are made with teams of people composed of mixes of disciplines, personalities and leadership qualities. Groups become assembled as a result of friendships, kinship, profit and expediency. Planning tasks are often considered as problems, problems to be uncovered and problems to be solved, when often a missing discipline's viewpoint may do much to dispel consternation and concern. Often a problem to one discipline may not be a problem to another. By contrast, in some planning tasks irrelevant disciplines to the task are present. A proper "mix" of those within a team should be considered as an important aspect of any research or design process. When a reasonable team is established with regard to group composition, then a higher probability of success may result.

At times urban planning problem identification may be sought; in this instance a mix of disciplines may be engineered to match both the problem-setting and the typology of the planning problem. Some urban planners and architects like Archibald Rogers believe that all problem-settings and problem-typologies require a design concept team of professional specialists. The appeal of interdisciplinary group formation is often that the outcome of the urban planning activity will be considered more valid if the group is composed of many individuals each prestigious in his own discipline. If a man with such impressive credentials could find time and energy to be involved with others in this planning task, then the outcome must be reasonable - both because he is involved and because he endorses the outcome. Another factor promoting bias towards interdisciplinary groups lies in the nature of our pluralistic society. Many groups with differing goals, and actors in decision-processes, form themselves and are assembled by others. Since the "wrong" people and the "wrong" group composition may often appear (politically) without any hope for premedi tated selection of individuals, by amassing an interdisciplinary planning group diverse individuals may be arrayed to cope with other diverse viewpoints increasing the acceptance factor of the plan(s).

Urban planning tasks have some unique aspects: some tasks are specifically design tasks and others are research. Design consists of going from the general need to the specific concrete solution(s). Research consists of going from unorganized facts and nebulous questions.
to a generalization or a new understanding of certain phenomena. Planning, as an activity, concerns itself with free movement between research and design tasks and both kinds of tasks contain elements of the other. These definitional differences have been delimited for the sake of conceptualization of our experimental designs, and the problem devised (Appendix A) inherently contains some elements of design with an emphasis upon research planning tasks. These authors believe that research planning tasks are more likely to be the most needful of group involvement. Professional planning attitudes appear to reinforce our beliefs. (By contrast, design may effectively be the willful act of an individual.)

In urban planning activities, there is increasing realization by members of the planning community that specialization by planners may be a counter-productive, inhibiting trend. Some examples might be: physical planners trained in physical design who design an aesthetically appealing but socially disfunctional suburban neighborhood; urban politicians who arrange policy change for one social group without regard to that groups' interaction with other social groups; or engineers who design a dam with little regard for the effects their project will have on ecology.

Fortunately in most instances, urban planners have been aware of the need for multi-dimensional, cross-disciplinary analysis and synthesis. Some planners are trained in tools and techniques of science and as members of the scientific community are disseminating their knowledge to attempt to counter a single-discipline approach; namely by promoting interdisciplinary strategies. The planners' concern for adequately considering the relevant aspects of his problem setting may be considered part of a "zeitgeist" pervading many disciplines. This trend may be evidenced in the "hard" sciences or physical sciences, by emergence of a number of "think tanks." In the "soft" sciences, or social sciences, this approach has been advocated by a number of sociologists (e.g. Robert Boguslaw, 1964) and psychologists (e.g. Sherif & Sherif, 1969).

The impetus for a multidisciplinary approach to problem resolution, design and research stems largely from the weaknesses inherent in the traditional single-minded approach. Specifically, critics of the single discipline approach argue that such a research and design strategy focuses on only one small aspect of a problem, and neglects the ramifications this type of solution will have on a total system. Advocates of the multidisciplinary approach believe that the identification of problems and the strategies employed in the resolution of these problems can be enhanced by turning from a research strategy wherein a single emphasis and methodology is used to a strategy that utilizes the expertise and methodologies of a number of disciplines.

It is important to note, however, that the efficacy of a multidisciplinary research strategy is an empirical question. While this approach is intuitively appealing, it is not at all clear whether or not this approach represents the "one best way." One can identify at least two factors underlying this skepticism. First, there may be some problem areas that can be more efficiently and effectively dealt with by using a single discipline approach. Second, research concerning factors that mediate the outcome of problem-solving groups is in an equivocal state.

With respect to these two factors that one should consider when attempting to decide which research strategy is most efficacious for a given problem, the first has aroused little research interest whereas the second has been of some concern for a number of years. A vast quantity of research has been directed toward factors mediating the outcome of group problem-solving. Some of the variables that have received a good deal of attention are the structure of the personalities of the individuals involved; the size of the group; the leadership of the group; and the composition of the group. Studies of research conducted in these areas are presented in Collins and Guetzkow (1968), Davis (1969), Hare (1962), and Marlowe and Gergen (1969).

Of all the factors that mediate the outcome of group problem-solving, the composition of the group is a very important variable—particularly when one is reviewing this literature in an attempt to reach a decision concerning whether a multidisciplinary or a single discipline approach is more advantageous for a given problem.

Group composition refers to the "mix" of the group members; that is, the heterogeneity of the skills and orientations of the group members. Urban planning efforts, by their nature contain elements of physical design, economics, social-psychology and others. Planners themselves may be thought to be heterogeneous in attitude, but still show some signs of insecurity during their planning task completion concerning their individual limitations. Numerous investigators have attempted to answer the question: Should a group be heterogeneous or homogeneous in order to perform in an optimal fashion? Probably, a homogeneous urban planning group may be considered as comprised of planners (those with graduate education in urban planning). However, most urban planning groups are often heterogeneous.

Generally speaking, research in this area suggests that heterogeneous groups yield solutions that are higher in quality than homogeneous groups. However, heterogeneous groups generally take longer to reach consensus and are afflicted with greater internal turnover (Davis, 1969, Chapter 4; Collins & Guetzkow, 1964).
opportunities they had identified during the course of their discussion of the problem.

Results

Hypothesis I
Heterogeneous groups will display more internal conflict than homogeneous groups.

A graphic display of the results obtained in conjunction with the first hypothesis is presented in Figure 2.

<table>
<thead>
<tr>
<th>Average No. of Interactions</th>
<th>120</th>
<th>110</th>
<th>100</th>
<th>90</th>
<th>80</th>
<th>70</th>
<th>60</th>
<th>50</th>
<th>40</th>
<th>30</th>
<th>20</th>
<th>10</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>homogeneous</td>
<td>9</td>
<td>0</td>
<td>34.0</td>
<td>18.3</td>
<td>92.0</td>
<td>39.3</td>
<td>17.0</td>
<td>9.3</td>
<td>5.3</td>
<td>13.3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>heterogeneous</td>
<td>14.7</td>
<td>0</td>
<td>43.0</td>
<td>20.7</td>
<td>102.6</td>
<td>77.3</td>
<td>21.7</td>
<td>8.3</td>
<td>2.0</td>
<td>7.7</td>
<td>7.7</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 2. Results of Interaction Process Analysis of homogeneous and heterogeneous groups.

With respect to the IPA analysis of the interaction among the homogeneous and heterogeneous groups, the mean number of interactions among members of heterogeneous groups was 309.3, while the mean number of interactions among the members of homogeneous groups was 244.3. A difference that was found to be statistically significant at the .01 level of confidence. (9) However, none of the results displayed in Figure 2, including those pertaining to IPA category six, were significant when tested individually.

Hypothesis II
Heterogeneous groups will yield higher quality end-products than homogeneous groups.

A content analysis of the end-products obtained from all of the groups is presented in Table 1. Note that "end-products" is defined as the problems identified, solutions proposed and opportunities suggested in association with a group's discussion of the problem.

(see Table 1. next page)

Interpretation of the Results

Discussion

The results of the foregoing data analysis present a rather ambivalent state of affairs. The investigators had expected to reject the first hypothesis and retain the second. In reality, however, both were rejected.

The first hypothesis -- that heterogeneous groups would display greater internal discord than homogeneous groups -- was rejected on the basis of an analysis of the interactions among the members of the groups. The heterogeneous groups, on the average, did evidence a greater number of interactions than the homogeneous groups. This is precisely what one would expect from groups embroiled in intra-group conflict. However, when these gross results were subjected to a more detailed analysis, the differences between homogeneous and heterogeneous groups disappears. The data presented in Figure 2 suggests the heterogeneous groups had not more difficulty establishing effective and productive interpersonal relations than did the homogeneous groups. None of the differences displayed in Figure 2 were statistically significant, including those associated with IPA category six.

It should be emphasized that the IPA profile of a group marked by a great deal of inner turmoil, hostility, and poor interpersonal relations would have low scores in categories one through three, or the categories pertaining to positive social-emotional relations (e.g. agreement, tension release, and displays of solidarity). Conversely, such a group would also be marked by high scores in categories 10 through 12, or the categories...
Opportunity more problems and suggest higher quality solutions for Solutions Homo. Gps 2.3 0.3 1.0 1.0 However, the homogeneous groups were lower in the positive social-emotional categories than were the heterogeneous groups. Furthermore, the heterogeneous groups did not differ significantly from the homogeneous groups in the negative social-emotional categories.

The second hypothesis—that heterogeneous groups would produce higher quality end-products than homogeneous groups—was rejected on the basis of the content analysis displayed in Table 1. The investigators had expected that, assuming they could establish effective interpersonal relations, the heterogeneous groups would uncover more problems and suggest higher quality solutions for those problems than the homogeneous groups. However, the data suggest that neither the quantity nor the quality of the problems identified, solutions proposed, and opportunities suggested differed significantly between the homogeneous and heterogeneous groups. The homogeneous groups identified, on the average, more problems and suggested more opportunities associated with the task, whereas the heterogeneous groups proposed more solutions. However none of these quantitative differences were statistically significant, nor were any of the qualitative differences shown in Table 1 significant.

Conclusions
The first conclusion to be drawn runs counter to much of the previous research in the area. This conclusion is that heterogeneous groups are not always prone to difficulties in the area of interpersonal relations. The data clearly suggest that neither type of group had an especially difficult time building effective interpersonal relations. Both groups were apparently able to concentrate on the task at hand rather than dissipating their energies on interpersonal infighting.

This conclusion must be moderated by two facts. First, the situation in which the participants found themselves was an artificial, laboratory environment. The artificiality of the situation, together with the fact that the subjects were continually observed, probably produced what the psychologist calls "demand characteristics;" that is, pressure on the subjects to behave exactly as the investigator told them to behave. Demand characteristics generally reduce the variability of a subject's behavior.

The second conclusion that may be drawn from the results of this study sheds some doubts on the efficacy of a multidisciplinary approach to problem-solving. The results summarized in Table 1 leads the investigators to conclude that the quantity and quality of the heterogeneous groups' performance was no better than the performance of the homogeneous groups. This suggests that, while a multidisciplinary approach may be intuitively appealing, such an approach may not always be justifiable.

This second conclusion is particularly damaging when viewed in terms of the outcome of the first hypothesis.

One would not expect heterogeneous groups to perform better than homogeneous groups when the interpersonal relations among the members of the heterogeneous groups were poor. However, in this research the interpersonal relations in the heterogeneous groups were as good as those in the homogeneous groups, yet the heterogeneous groups still did not outperform the homogeneous groups.

This second conclusion, like the first, must be tempered by several considerations. First, the one hour time constraint imposed on the groups may have restricted both the quantity and the variability of the outputs of the groups, particularly the heterogeneous groups. Second, the artificiality of the situation should be considered as a possible source of contamination with respect to this conclusion as well as any others drawn from the study.

To reiterate, the analysis of the data collected during the course of this study suggests that heterogeneous groups may not always be superior to homogeneous groups in the area of problem-solving. The impact of these conclusions should be obvious. The trend toward multidisciplinary research and design groups may not yield outputs that are greater in either quantity or quality than single discipline research and design groups. In fact, such heterogeneous groups could conceivably be detrimental, particularly when a problem calls for the expertise of one discipline and/or there is reason to believe that the interpersonal relations of a prospective multidisciplinary research and design group will be poor.

Suggestions for Future Research
A good piece of research should do at least two things: I should provide the reader with insight into the area under consideration, and it should suggest additional

<table>
<thead>
<tr>
<th></th>
<th>X No.</th>
<th>Quality of Outcome</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Homo.Gps</td>
<td>Fair</td>
</tr>
<tr>
<td>Problems Identified</td>
<td>8.3</td>
<td>0.0</td>
</tr>
<tr>
<td>Solutions Proposed</td>
<td>2.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Opportunities Suggested</td>
<td>4.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Table 1. Content Analysis of Outcome from Homogeneous and Heterogeneous Groups.
work that needs to be done. There are a number of factors that have been touched upon in the present study that require additional research.

One such factor is the element of time. In the present study the subjects were only given one hour in which to interact. This, no doubt, contributed to the artificiality of the study, and may have restricted the quantity and variability of output of both groups. A more adequate research design would require subjects to meet several times (e.g. five one hour meetings) to discuss the problem and formulate solutions.

Another factor that needs even more consideration is the task or problem on which the subjects work. The problem used in the present study was chosen because it was of general interest and widespread concern, and did not call on the special talents of any one discipline. However, it is quite probable that there are certain tasks that are inherently more suitable for the multidisciplinary approach to research and design whereas other problems are probably more suited to a single discipline approach.

APPENDIX A - TASK ASSIGNMENT

Assume that funds for the SST (supersonic transport commercial aircraft) have been secured from Congress.

Discuss this project's problems and opportunities.

Identify as many problems, opportunities and their solutions as you can.

APPENDIX B - IPA CODING SHEET

(1) SHOWS SOLIDARITY:
    raises others status,
gives help, reward,
jokes.

(2) SHOWS TENSION RELEASE:
    shows satisfactions

(3) AGREES:
    shows passive acceptance, agrees,
complies, concurs,
understands

(4) GIVES SUGGESTION:
    direction, implying
    autonomy for other

(5) GIVES OPINION:
    evaluation, analysis,
expresses feelings,
    wish

(6) GIVES ORIENTATION:
    information, repeats,
    clarifies, confirms

(7) ASKS FOR ORIENTATION:
    information, repetition,
    confirmation

(8) ASKS FOR OPINION:
    evaluation, analysis,
    expression of feeling

(9) ASKS FOR SUGGESTION:
    direction, possible
    ways of action

(10) DISAGREES:
    Shows passive rejection,
    formality, witholds help

(11) SHOWS TENSION:
    Asks for help,
    withdraws out of
    field, laughs

(12) SHOWS ANTAGONISM:
    inflates others status,
defends or asserts self

NOTES

(1) Research completed in association with The Multidisciplinary Studies Group -Center for Systems Science, Oklahoma State University

(2) Asimow, Morris, "INTRODUCTION TO DESIGN, p. 44, Prentice-Hall; 1962, states that designing should not be equated with problem-solving. It is more like "problem-finding." The designer is presented, not with a problem, but with a "problem-situation."

(3) Many urban problems have been identified as being caused in part by a lack of comprehensive thinking and foresight in the process of identifying, analyzing and solving problems related to the man-made and natural environment. "Meyer, William T.; "Environmental Problem-Solving;" in JOURNAL OF SYSTEMS MANAGEMENT, Vol.22, no. 10; October 1971, p.22.


Defined as: the propensity for policy and goal formulation attitudes developing in certain directions after a series of meetings.

See Appendix B for IPA Category Definitions.

The analysis was chi-square.

The quality of outcome was determined by the two experimenters' subjective evaluation.

REFERENCES


Davis, James H.; Group Performance; Addison-Wesley; Reading, Mass.; 1969.

Hare, A. Paul; Handbook of Small Group Research; Free Press; N.Y.; 1982.

Lindzey, Gardner & Aronson, Elliot eds.; Group Psychology and The Phenomena of Interaction; in The Handbook of Social-Psychology; Vol. 4; Addison-Wesley; Reading, Mass.; 1969.

Marlowe, David & Gergen, Kenneth J.; "Personality & Social Interaction;" Ch.25, in Handbook of Social Psychology; 2nd Ed.; Vol. 3; ed. by Lindzey, Gordon, and Aronson, Elliot; Addison-Wesley; Reading, Mass.; 1969