An investigation of task team structure and its impact on productivity

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ABSTRACT

Productivity in the information age is widely perceived to be a major problem facing many organizations. One strategy to enhance organizational productivity has been the use of task teams. Assignment to task teams usually reflects individual technical expertise, individual availability, and/or positional politics rather than a focus on the effectiveness of the team members in the specific organizational situation. This paper investigates characteristics of team members and then examines the effect on team effectiveness of these characteristics and of the requirements of the organizational activity.

Two organizational situations were investigated. The first was a true unstructured organizational situation. A field study was used to investigate two project teams in this situation. The second organizational situation was structured and administered in a controlled setting; members of a programming class constituted the participants in the second situation. The Myers-Briggs Type Indicator was used to determine the perceptual characteristics of team members and thus determine the heterogeneity or the homogeneity of the teams.

The findings indicate that the situational structure determines the overall effectiveness of the team composition. They also offer evidence that heterogeneity in group composition is best for solving complex problems, whereas homogeneity is best for solving structured, less complex problems. It also suggests that one team might not be appropriate for all stages of a project. As the nature of the tasks involved in the project change, it could be that the optimum team composition would also change. Much further research must be aimed at strategically assembling the most productive team for any number of organizational situations.
INTRODUCTION

Productivity in the information age is widely perceived to be a major problem facing many organizations. In fact, strategies to enhance human productivity have been the focus of many research studies. An idea resulting from current studies aimed at increasing organizational productivity and dealing with complex, multidimensional information systems has been that of task teams. These teams are used in such diverse organizational activities as systems development and implementation, strategic planning, and office automation. Such teams are formed and interact for the primary purpose of vitalizing decision making, innovative thinking, and productivity. Assignment to task teams usually reflects individual technical expertise, individual availability, and/or positional politics rather than a focus on the effectiveness of the team members in the specific organizational situation.

Evidence is mounting that an optimum team composition in one situation, regardless of technical skills, is not necessarily the optimum team composition in another. In fact, a major effect on the productivity and effectiveness of the team seems to be situational. Little work has been done to determine the situational components that determine team effectiveness. This paper investigates characteristics of team members and then examines (1) the effects of these characteristics and (2) the requirements of the organizational activity on team effectiveness.

CHARACTERISTICS OF TEAM MEMBERS

Behavioral research theories have added credibility to the process of explaining individual perceptual differences. One of the primary contributors to such theories has been the Swiss psychologist Carl Jung. The merit of Jung's theory is that it accounts for many human differences which other theoretical frameworks leave to random variation; yet the theory has the merit of unusual simplicity. Briefly, Jung's theory is based on the assumption that much apparently random variation in human behavior is actually quite orderly and consistent, directed at the differences with which individuals prefer to gather and evaluate information in their environment. Jung combines these differences into four basic types that are summarized as follows:

1. The Intuition-Thinking (NT) type is the one who observes and inputs data from a holistic or system type of framework. He/she sees things perhaps not as they are but as they can be—as possibilities. The Output or evaluation of these possibilities is judged in accordance with some formal rules, and the NT type tends to be impersonal in judgment.

2. The Intuition-Feeling (NF) type will observe input data in the same way as the NT; but the information will be judged in a personal or value-laden manner, such as good or bad, pleasant or unpleasant. This personality does not follow formal rules of logic.

3. The Sensation-Thinking (ST) type is one who sees information as concrete facts. He/she will then turn the specific facts into a formal solution according to some well-defined set of rules. The ST type is desirous of working on specific, clear problems and will probably be characterized by a low tolerance for ambiguity.

4. The Sensation-Feeling (SF) type also prefers to observe concrete facts apart from their totality, but is less formal in his evaluation of the data. The SF type does not apply the facts to a formal solution or model but instead uses a subjective, value-laden assessment. Jung's typology emphasizes only each type's major strengths and weaknesses without considering any one better than another. Mason and Mitroff relate the Jungian scales specifically to information systems and discuss the heterogeneity of each type:

Each of these types has a different concept of information and this is important for MIS design. If one is a pure thinking type, information will be entirely symbolic, e.g., some abstract system, model, or string of symbols devoid of almost any theoretical content. Thus, Sensation types speak of "raw data," "hard facts," and "numbers." For Intuition types, information will be in the form of sketches of future possibilities. Information for feeling types emphasizes a strong moral component. What is information for one type is definitely not information for another. [p. 476]

TEAM COMPOSITION

Each individual team member has a perceptual style that influences the information perceived and the behavior exhibited in problem solving and task completion. Research has shown that the more similar the perceptual styles of individuals, the more harmonious the group relationships. Since much of any team's early activities are devoted to establishing group relationships, it would indicate that the more homogeneous the individual group members, the less time this early effort would require. Research has also indicated that homogeneous groups are characterized by cohesiveness and freedom from conflict. Although these studies indicate that harmonious relationships are a byproduct of homogeneous teams, other
researchers have important reservations about the central theme of homogeneity. Mitroff and Kilmann discuss the impact of team homogeneity on task solutions:

If the extreme homogeneity of each group is a blessing in that it reinforces the natural strengths and similar tendencies of each individual in the group, then the extreme homogeneity is also a danger in that it magnifies the weaknesses (i.e. the one-sidedness) of perceptions of the individuals. [p. 19]

Myers also discusses the composition of teams and indicates that homogeneity can deter productivity. She states,

If the group is composed of very different types, agreement will be harder to reach than if the group was homogeneous but the decision will be more broadly based and thoroughly considered, and thus in less danger of turning out badly for some unperceived reason. [p. 17]

Such findings indicate that homogeneous teams are characterized by freedom from conflict but that heterogeneous teams may be more productive. Another body of research examines the nature of the organizational problems faced by such teams.

ORGANIZATIONAL PROBLEMS

An organization faces a tremendous variety of problems, which vary considerably in degree of complexity. A framework identifying the differing complexities is that used by decision theorists, in which they refer to a problem as structured or unstructured. Briefly, a structured problem is one that can be well defined in the sense that the key variables, such as the various states of nature, possible actions, possible outcomes, and utility of outcomes are known. The unstructured, or wicked, problem is one that cannot be clearly defined. That is, one or more of the variables discussed either is unknown or cannot be determined with any degree of confidence. So decision making in organizations must deal with problems that run the gamut from the simple to the complex and beyond that to the ambiguous. Specifically, it is expected that for problems characterized by a high degree of structure, the information will be processed by the team in a logical sequence. This notion is supported by a number of research studies. For tasks characterized by a low degree of structure, it is exceedingly difficult for the group to evaluate information. In these tasks the team structure must be able to manage not only this complexity but also large volumes of information. Very little research has been directed at determining how these variances in problem requirements affect team composition. This study investigates the effect of team composition (heterogeneous or homogeneous) on the structured and unstructured organizational problem.

RESEARCH

Setting and Method

Two organizational situations were investigated. The first was an unstructured organizational situation. A field study was used to investigate two project teams in a true unstructured organizational situation. Kilmann says that, assuming that a researcher can obtain access to such organizations, field studies can monitor the dynamics of the design process, and external validity will be moderately high. He also writes that such studies can suggest characteristics and outcomes that are otherwise unavailable. The second organizational situation was structured and administered in a controlled setting. Members of a programming class constituted the participants in the second situation.

The Myers-Briggs Type Indicator (MBTI) was used to determine the perceptual characteristics of team members and thus determine heterogeneity or homogeneity. The Myers-Briggs Type Indicator has been used repeatedly to measure Jung’s typology and has established reliability. Although the MBTI is not the only instrument available to determine perceptual differences, it was chosen in this study because of the number of business studies utilizing this instrument.

Unstructured Situation

The two project teams that were observed had ten team members each and were charged with systems development activities. Members of the two project teams were already assigned at the time of the investigation, and thus team composition was not manipulated by this researcher. The team compositions, as identified by the MBTI, are shown in Table I. The results of the interviews with key users, team members, and MIS management are summarized as follows:

<table>
<thead>
<tr>
<th>Project Team 1</th>
<th>Project Team 2</th>
</tr>
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<tbody>
<tr>
<td>A. Failed system</td>
<td>A. Successful system</td>
</tr>
<tr>
<td>B. A technical orientation</td>
<td>B. Technical and people orientation</td>
</tr>
<tr>
<td>C. Inadequate documentation</td>
<td>C. Comprehensive documentation</td>
</tr>
<tr>
<td>D. Rated as unsuccessful</td>
<td>D. Rated as highly successful</td>
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An in-depth account of the interview information has previously been written. Project Team 1, with a void of Feeler types (SF or NF), was classified as homogeneous. Project Team 2, with all four MBTI types represented, was classified as heterogeneous. It would seem that in such an unstructured situation as the systems development activities assigned these
two project teams, it is exceedingly difficult to have all relevant information evaluated. When the group is homogeneous in its information-evaluation orientation (as in the case of Project Team 1), performance suffers. Project Team 1 exemplified a narrower perceptual viewpoint, as indicated by team members interviewed; this is attributed to their one-sided perceptual nature. Project Team 2 exemplified a broad organizational perspective, from interviews of team members; this is attributed to their diverse perceptual orientations. These findings also support research conducted by Kaiser and Bostrom that a project team with all four MBTI types represented was successful while a project team void of feelers was unsuccessful.14

Although many factors cannot be controlled in a field study such as the one conducted, evidence is offered that indicates that heterogeneous teams are more successful than homogeneous teams in unstructured organizational situations. Specifically, the conclusion is that the heterogeneity achieved by combining all four perceptual types on a project team is optimum in an unstructured organization situation. This conclusion is pictorially illustrated in Figure 1.

Structured Situation

To further clarify the situational variables that affect team performance, both heterogeneous and homogeneous teams were examined in a structured situation. Members of a programming class were assigned to either homogeneous or heterogeneous team combinations. A timed programming task that met the definition of a structured problem was assigned. The problem was composed of materials that had been previously taught, and all students had successfully solved similar problems. The time factor made it essential that problem definition be determined quickly to enable a team to complete the task. Solutions were considered on two dimensions: completeness and correctness. Three heterogeneous and three homogeneous teams were structured as shown in Table II. No attention was given to individual personalities; rather, groups were assembled solely on the basis of MBTI types. All MBTI types were included in heterogeneous teams. The information-gathering orientation (Sensing) was the same for heterogeneous teams. The results of the task by team are as follows.

**TABLE II—Perceptual styles of heterogeneous and homogeneous teams**

<table>
<thead>
<tr>
<th>Heterogeneous</th>
<th>Homogeneous</th>
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<tr>
<td>Perceptual Teams</td>
<td>Perceptual Teams</td>
</tr>
<tr>
<td>Team 1: NT, NF, ST, SF</td>
<td>Team 4: ST, SF, ST, SF</td>
</tr>
<tr>
<td>Team 2: NT, NT, SF, ST</td>
<td>Team 5: ST, ST, ST, SF</td>
</tr>
<tr>
<td>Team 3: ST, ST, NT, NF</td>
<td>Team 6: ST, ST, SF, SF</td>
</tr>
</tbody>
</table>

The surprising results were that the heterogeneous teams were unable to complete the task within the given time, although individual team members had previously completed similar tasks in the given time successfully. The group evaluations completed by each team member upon completion of the experiment were particularly enlightening. Individuals on heterogeneous teams said that a consensus between team members about the problem definition was not reached in time to complete the assigned task. The group evaluations completed for the homogeneous groups indicated that consensus was reached quickly and work finished quickly. In regard to group composition, the homogeneous groups indicated that consensus was reached quickly and work finished quickly. In this structured task, the heterogeneity of information-gathering styles seemed to hinder group process and undermine the overall effectiveness of the team. Further evidence of these findings is offered in unpublished research conducted by Aamodt and Kimbrough.38 They found that heterogeneous teams were not as
successful as homogeneous teams in completing a structured debugging task. In such structured situations, it could be that homogeneous groups are able to work together to complete the task quickly. Heterogeneous groups, however, may have to deal with the tension created by their diverse group composition and be unable to overcome the tension in time to complete the task.

The finding that heterogeneous groups were unable to complete the task was serendipitous; therefore many controls were not used that would have made these findings more conclusive. However, this study, together with the study by Aamodt and Kimbrough, lends evidence that in an organizational situation where the information is finite and limited, homogeneous team compositions may be the most productive. This conclusion is pictorially illustrated in Figure 2.

DISCUSSION

This study offers preliminary evidence that the situational structure determines the overall effectiveness of the team composition. It also offers evidence that heterogeneity of group composition is best for solving complex problems, whereas homogeneity is best for solving structured, less complex problems. This research points to the need for critical delineation of the nature of the problem to be solved when assembling teams. It also suggests that one team might not be appropriate for all stages of a project. As the nature of the tasks involved in the project changes, it could be that the optimum team composition would also change. The optimum team composition in the initial stages of problem definition could be counterproductive in stages of the project that were action-oriented and required quick concurrence among team members to proceed. It also suggests the need to define these stages of the project and possibly form subunits of the project team to complete various aspects of the project. It offers an explanation of the failure of many task teams. A team that worked well and productively in one stage of a project can dissolve into conflict, dissent, and inertia at another stage simply because the team composition is not compatible with the current situational variables.

Although these findings are preliminary, they do present evidence that optimum team compositions vary and depend on situational variables. Only a narrow scope of situational variables were investigated in this study. Much further research must be aimed at strategically assembling the right team for any number of organizational situations. Productivity in the information age may well hinge on task team experimentation as a method of tapping one of the crucial resources available to the organization—the human resource.

REFERENCES
