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Individual openness, rational argumentation, organizational learning culture and a group’s ability to reach consensus for problem-solving in school settings

Whang, Nai-Ying, Ph.D.
The Ohio State University, 1993

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Individual Openness, Rational Argumentation, Organizational Learning
Culture and A group's Ability to Reach Consensus for Problem-Solving
in School Settings

Dissertation
Presented in Partial Fulfillment of the Requirements for
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By
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Consensual decision-making has been researched for twenty years in school settings (Eisner, 1991). Collective efforts usually lead to more successful accomplishments than that of individuals. However, in general, a consensus is very difficult for groups to reach, especially in a culture which is marked by an ideology of individualism (Zey, 1992). To reach consensus in group decision-making is always thought of as difficult. In spite of this dilemma, doing research on reaching consensus in a group setting is popular for promoting organizational development and increasing the quality of policy-making.

Consensus has been defined many different ways. A unanimous agreement on a decision (Eisner, 1991) has long been the official definitions of consensus. Recently, however, this definition seems to have been challenged, because people may show unanimity superficially. Superficial consensus, to which people adhere in a formal meeting, but are against in private, may waste some time and energy when implementing decisions. Because peoples' behaviors (theory-in-use) differ from what they say (espoused theory), (Argyris, 1978), task coordination and error correction are difficult. If so, when decisions are implemented, apathy, withdrawal, or resistance might make the decision unattainable in reality. Such a phenomenon may be termed...
"false consensus." Therefore, consensus may better be termed as
decision-making in which members who participate in the group
reach mutual acceptance of genuine agreements through open
communication (Schein, 1969). Such a decision may be called "true"
or "deep" consensus. In this situation, communications are sufficiently
open and the group climate is sufficiently supportive that a fair chance
is recognized to implement that decision.

Teachers and administrators should attempt to seek consensus
although consensus-seeking is time consuming work. Consensus is
likely to prevent psychological withdrawal, since the decision is not
seen as a radical change (Burrel and Morgan, 1984). Also, consensus-
oriented group discussions not only expose individuals to elements of
a common scheme rapidly, but the discussion may stimulate the
individual to achieve a greater understanding of the scheme (Calder &

Newman (1992) specifies two kinds of organizations: procedure
organizations and production organizations. School systems are
procedure organizations. Procedure organizations stress opportunities
and effective procedures for serving an organization. Consensual
decision-making is desirable, because educational decisions usually
serve students, and people should not be imposed on by arbitrary
authority.

Furthermore, consensus based on open communication for
problem-solving can produce creativity in decision-making and
innovation for school organizations (Hare, 1982). Usually, decision-
makers are biased in making judgments according to their experience
in ways that exclude diverse viewpoints. The exclusion may keep them focused on the status quo and existing reality. Thus, a decision that is reached becomes measurably more conservative, due to the limited viewpoints.

Consensus and good quality oriented decisions could possibly reinforce ethics and creativity in policy-making. Without ethics, decision-making is unable to serve all of the organization’s people because some of them have been ignored; without creativity, decision-making is empty, because old thinking reproduces old problems. That is why Kurt Lewin (1954) postulates that one of the best ways to understand the world is to try to change it. Thus, a good policy should utilize both ethics and creativity.

Groups have been used widely as a tool for consensual decision-making. Exploration of group decision-making can provide sufficient information for more effective problem-solving (Nutt, 1989; Daft, 1986). On the other hand, group decision-making can generate some weaknesses. If group members cannot overcome potential shortcomings, group decision-making may not be an appropriate approach for problem-solving. For example, group decision-making may be dominated by an individual; or group decision-making may be used by one supervisor to identify scapegoats.

Usually, the strengths and weaknesses of group decision-making are produced by individuals, the group itself, or its external environment. This dissertation will explore how the selected factors can effect a group’s ability to reach consensus for problem-solving in a school setting.
Problem

The principal is vital to the successful operation of a school. Teachers and other administrators also are important to that success. A successful school administration can develop and integrate the intelligence of principals, administrators, and teachers for organizational development. Successful group decision-making is a good approach, not only to generate support and cooperation among school staffs, but also to provide direction for organizational growth.

The focus of this study was on teachers' and administrators' perceptions of consensus and the quality of group decision-making in permanent decision-groups. The study attempted to understand the extent to which individual openness and a climate of rational argumentation among group members influenced the quality of decision-making as perceived by teachers and administrators. In addition, the study set out to examine the effects of an organizational culture that was perceived as fostering learning. This dissertation investigated the interrelationships among individual openness, rational argumentation, learning organizational culture, consensus and the quality of decision-making. Finally, the study attempted to ascertain the relationship between the linear combination of individual openness, rational argumentation, and organizational culture for learning and the linear combination of consensus and the quality of decision-making. Also, it analyzed the differentiated contribution of individual openness, rational argumentation, and learning
organizational culture to the combination of the quality of decision-making.

Determining which factors influence group members' (teachers and administrators) perceptions is always somewhat subjective. Once the areas to be investigated have been established, however, data can be collected and compared and conclusions can be drawn.

Teachers and administrators who participate in a decision-making group hold the answers to many of the questions investigated. The research is focused on what teachers and administrators think and feel, how they perceive their decision-making, and their perceptions of interrelationships among the five variables—individual openness, rational argumentation, learning culture, consensus, and the quality of decision-making.

Hypotheses

The specific alternative hypotheses investigated in this study are as follows:

H1 Each of the following variables is significantly related to one another: individual openness, rational argumentation, learning culture, decision-making quality, and consensus.

H2 Decision-making quality is significantly related to the linear combination of individual openness and rational argumentation.
H3 Consensus is significantly related to the linear combination of individual openness, and rational argumentation.

H4 The proportion of decision-making quality accounted for uniquely by individual openness or rational argumentation is significantly different from zero.

H5 The proportion of consensus accounted for uniquely by individual openness or rational argumentation in the population is significantly different from zero.

H6 The linear combination of individual openness, and rational argumentation is significantly related to the linear combination of decision-making quality and consensus.

H7 Individual openness contributes to the linear combination of decision-making quality and consensus (or respectively, decision-making quality and consensus) significantly differently from rational argumentation.

H8 The linear combination of individual openness and rational argumentation contributes to decision-making quality and is significantly different from consensus.
Significance:

Decision-making is the major function of school administration (Simon, 1955). Administrative decisions must be carried out by staff members who decide how to implement them. That implies that two dimensions should be considered by decision-makers: (1) the quality of decision-making and (2) factors affecting collective action for implementing decisions (Barnard, 1968). These two dimensions are influenced by individual factors, group factors and environmental factors in group decision-making, and can be improved by individual openness, rational argumentation and learning culture.

From an organizational perspective, Simon's "programming" process (1955) and Victor Thompson's "computation" process (1967) point out the most serious weaknesses of the decision-making process: it is derived from assumptions about hierarchical control and environmental stability. However, the two processes ignore human nature and quick changes in environment.

In addition, from the individual perspective, psychological, cognitive and motivational factors create biases that influence the quality of decision-making. A decision produced by an individual has less chance of acceptance within an organization. The decision-maker may be "power hungry" and exercise prejudices. It is unreasonable to expect all the people in the organization fully to accept a decision made solely through an individual's subjectivity and authority. Naturally, not all the people can be convinced by one individual's
decision and judgment, and many may show resistance toward that decision.

Sutherland (1977) said that a world crisis can be created by an individual personality. This implies that it is dangerous for the fate of an organization to be controlled by one individual, because an individual is loath to see his/her own blind spots clearly. For this reason, group decision-making is a good tool for improvement and organizational change. Bennis (1976) says that an organization needs democracy, because an individual’s cognition changes over time. Using a group as the unit of democratic decision-making becomes necessary.

Effective group decision-making can be viewed as good leadership. Argyris (1957) emphasize that healthy human values of self-actualization and self-esteem should be expanded in organizations. However, most modern schools accept the effects of authoritarian control, which often hinder an individual’s healthy development. Group decision-making has the function of balancing the dilemma between self-development and organizational control (Argyris, 1957).

In other words, the trend has been shifting toward group decision-making to create a democratic management in school settings. In traditional studies, group decision-making was viewed as a group “discussion leading to decision” (Lewin, 1943) that emphasized the dynamics of group interaction. It became a popular theory describing the decision-making process in the late 1950's and the 1960's. A famous theorist of organization, Rensis Likert (1961) proposed the management model of System 4 and Participative Decision-Making (PDM) which promoted performance, satisfaction,
and morale. However, the two theorists stressed only the groups' function of coordination and participation, while ignoring the function of problem identification.

According to the experimentation of Nutt (1992), group decision-making to reach consensus can compensate for the deficiencies of individual decision-making, thus creating a higher quality of decision-making. In his experimentation, Nutt emphasized both problem identification and group interaction. The experimentation showed that group members solved problems effectively when they concentrated on both problem identification and consensus seeking.

Mitroff and Mason (1981) found that individual, social, political, and cultural factors may determine the success or failure of group decision-making. According to informational influence theory, three characteristics of the information influence group decision-making: (1) its direction, (2) its persuasiveness, and (3) its novelty (Calder & Schurr, 1981). Individual, social and cultural factors also influence the three characteristics of information. For example, when group members communicate for problem-solving, they may not change a disposition to try new information, but hear information that supports the behavior they favor. Attitudes usually do not change to match a context or situation and that lowers a group's ability to diagnose problems (Bein, 1972).

Effective group process seems to depend on three factors -- individual openness for speaking truthfully and questioning his/her own and others' thinking; rational argumentation for collecting
information and testing different assumptions; and a culture to support learning characterized systemic thinking, personal mastery, expanded thought process to make sense of people's action, shared vision, and effective mutual learning.

Significance of the Problem

Since little in a school setting can be accomplished without natural support, cooperation and commitment to organizational goals and the correct diagnosis of organizational problems, the focus of the research was on consensus and the quality of decision-making as perceived by the group members. An attempt was made to identify what teachers and administrators perceive to be the extent of individual openness, rational argumentation, and learning culture, and consensus and the quality of group decision-making. Genuine consensus and a high quality of group decision-making is desirable and important for successful school administration. The findings from such a study might provide information to assist school administrators in developing collective abilities and taking effective action for achieving school goals. These findings could help make the school in which they work a better place for teachers and administrators, because equity, cooperation, doing right things, and a harmonious school climate could be attained through a thoughtful decision-making process. In addition, the findings may help the department of education to find a thoughtful process of policy analysis for their educational system. Institutions of higher education may be able to develop training
programs which will better prepare administrators for dealing with school problems, developing school organizations, for dealing with conflict, for developing a sense of mission within the teaching staff, and for choosing a leadership style for producing a more effective organizational culture.

Definitions of Terms:

In this study specific concepts will be used as they are defined here, and the findings will be confined by the definitions.

**Openness:** Openness is defined as each individual's susceptibility to influence from others and willingness to share his/her thinking. In this study the operational definition is a score from a scale entitled Individual-Group Interaction.

**Rational Argumentation:** Rational argumentation is defined as the group members' ability to clarify assumptions and issues with reason and logic during group decision-making about controversial issues. In this study the operational definition is a score from a scale entitled Rational Discussion.

**Organizational Culture For Learning:** Organizational culture to support learning is defined as organizational characteristics that influence members to expand their capacities, to nurture new patterns of thinking by systemic thinking, to move toward a shared vision, to
encourage individuals to pursue self-esteem and self-development, and to foster members who are continually learning how to learn together. The definition is operationalized through a score by two items from a scale titled Organizational Culture for Learning.

**Decision-Making Quality:** Decision-making quality is defined as the members' perception that decisions are good or bad. This is measured by a scale entitled How Does Your Group Make Decisions.

**Consensus:** Consensus is decision-making when members who participate in group decision-making reach genuine mutual agreement through sufficient interaction and open communication. It is defined in this study by a self-report scale titled Making Decisions.

**Limitations of The Study:**

1: Confounding variables, such as group size, environmental pressure and specific types of decisions are difficult to control.

2: Generalization is difficult because of the number of variables affecting decision-making in the groups included in the study. The study cannot generalize to a larger population, because it is not a random sample.
3: Self-report instruments may not measure true behavior in group settings.

4. The groups of 3 operate differently from groups of other sizes.
Chapter II

Literature Review

Every school staff wants support and cooperation from the staff. Also every school faculty needs to make correct decisions for improving the school. The purpose of the literature review is to develop a group theory about making effective decisions. The review suggests that a genuine consensus has to be based on certain relationships with authority. It also suggests how to assess a decision.

The literature review analyzes what biases are created by group decision-making that influence decision quality and consensus. Then, this study attempts to analyze why individual openness, rational argumentation and learning culture help develop a group’s ability to make a good decision and reach consensus by eliminating these biases.

This literature analyzes which individual, group and environmental factors, respectively, influence individual openness, rational argumentation and learning culture. Both theory and practice are necessary to develop this study.

For the purpose of this study, the following related areas will be used to organize the review of literature: consensus and decision rules, the shortcomings of group decision-making, individual factors, group factors, and environmental factors.
Decision rules, such as consensus, voting and hierarchical rules, are defined as the relationship of authority to influence decision-making. Harmon (1981) said that decision rules for effective decision-making emphasize that social meanings logically satisfy the criteria for effective decision-making.

Consensus is a kind of decision rule (Nutt, 1989; Runkel, 1976). It is a representation of a shared value that respects diverse values equally and permits them to exist in administrative work simultaneously (Bernstein, 1990), usually implicitly or explicitly, which provides coherence, in both cognitive and affective sense, to a social system (Harmon, 1981). These shared values orient people toward a common understanding of goals, planning, policies, or action.

Consensus in organizational management has two closely related meanings (Harmon, 1981). The first view is consensus as a process by which individuals in face-to-face confrontation, synthesize divergent positions and viewpoints on a problem into a better solution than any of those initially preferred. The characteristic of the process is a relatively noncoercive one. In the second view, consensus in decision-making groups simply is measured by the “acceptability” of the results of a decision.

Usually, the requirement of genuine agreement is a crucial one. Achieving consensus can help people perceive organizations more accurately, because the appropriate information for problem-solving is produced, and distorted thinking is eliminated due to a decrease in domination. Understanding some characteristics of consensus helps to
clarify its function. These characteristics include: (1) active-social self, (2) disaggregation, (3) intersubjectivity, (4) dialectic between means and ends, and (5) the meaning of consensus-seeking. Only under all the five relationships of authority among group members can genuine consensus be achieved.

**Consensus and Active-Social Self**

An active-social self in group interaction means that individuals can express themselves autonomously. In other words, no member is constrained by others. Unilateral decisions imposed by one or a few on others constrain the exercise of creative potential and free debates in group decision-making. The hierarchical rule which reinforces unilateral decisions is viewed as a form of domination that obstructs cognitive and intellectual development. The top-down relationship maintains an administrative structure to preserve existing social relationships.

Voting is the most popular decision rule for solving conflicts in many organizations. However, the exclusive relationship between the majority and the minority is called tyranny of the majority (Dahl, 1989) that might threaten decision-making quality. An overemphasis on the final victory of the majority produces psychological dependence that causes people to avoid finding better information and trying new thinking. A vicious cycle of thinking influences every member: Everything will be O.K ultimately, so it is not necessary to worry too much.

People can understand the purposes of problem-solving, when
they consent to the processes of decision-making at the same time. Srivastva (1983) says that forcing agreement by adopting procedures that "flatten" or simplify perspectives ought not be adopted by a group. Thus, consensus is hard to reach by collective voting itself or hierarchical authority. Also, voting and hierarchical rules are not necessarily ethical. When two or more mutually competing choices are the issues, only one side "wins", the voting process polarizes members (Runkel, 1976) and a zero-sum game always prevails in group discussions.

Mutual agreements on a decision as a practical matter are very desirable. The characteristic of mutual agreement stimulates decision-makers to show active willingness to analyze the issues, which makes decisions credible and moral (Schein, 1969). Consensus decision-making provides the sense of active and social self that emphasizes both respect for individuals and the group. All members have an opportunity to personalize themselves in the decision-making process. All the members' voices are associated with a decision which can develop a cooperative sense among the group members.

**Consensus Decision-Making and Intersubjectivity**

Intersubjective decision-making implies that decisions are "objective," they are unbiased for all group members (O'Shaughnessy, 1972), and there is a desire to look for consensus (White, 1990).

The intersubjective process implies that the validity of knowledge for problem-solving is affirmed through consensus. This knowledge is developed by integrating individual meaning and
contextual meaning through group members, rather than pure external standards of constraints. That is, the knowledge does not represent an "external" ontological reality, but rather potential development of a world constituted by mutual experiences. In other words, mutual constraints as a goal become a path toward real consensus (Simon, 1955).

In the intersubjective decision-making process, a constitutive relationship between group members and organizational reality strengthens the integration among human nature, organizational structure, technology and environment. Hierarchy and voting decision rules are suspect because they fail to recognize the legitimacy of those intersubjective processes. All individuals' value systems can be respected completely in an intersubjective process so that members can accept a decision.

Consensus Decision-Making and Disaggregation of Decisions

Administrative management usually prefers to look for an advantageous excuse as an efficient control to maintain the legitimacy of its own authority. Hierarchy and voting rules as aggregated decision-making usually fit as its excuses. Negative consequences may be ignored through a postulation of uniformity in that it is arrived at by imposition rather than by spontaneous acceptance.

The disaggregation of decisions to provide discretion respects different values. The juxtaposition of values promotes members' willingness to solve problems. An empowered system supports the articulation and transmission of ideas among members (Kreisberg,
Such an arrangement enhances a free exchange in information. When members are free to interact, the disaggregation of decisions of the group becomes the entitlement of the traditionally disenfranchised members (Harmon, 1981). These disenfranchised members energize the group's growth by maintaining continuous dialogue, and then consensus is finally achieved and makes gradual progress for their organization.

**Consensus and Dialectic Between Means And Ends**

A fluid and dialectical relation between ends and means is important for revealing acceptable purposes because contextual meaning is found and people make sense of the action of choice (Tobert, 1985). With the development of the dialectical relationship, decision-making is continually naturally modified through open communication because context changes over time (Simon, 1955, 1960). The dialectical relationship between means and ends avoids having ends impose meaning and it avoids stressing means while ignoring the motivation to progress toward chosen ends. In other words, group structure must give an account of means-ends chains relative to the contextual meaning for which it was intended (Myer, 1984).

Wayson (1993) argued that one of the “failure-orientations” in current school systems is “substituting means for ends.” This provides powerful evidence that the dialectical relation of means-ends chains is important to avoid a non-progressive organization. In the same sense, consensual decision-making is less likely to be skeptical
about the motive of others, because members synthesize means and ends (Harmon, 1981). Otherwise, the desire to win an advocate who might serve one's own interests sometimes distorts members' action because means or ends are easily manipulated if they are separated.

Meaning Seeking

Consensus-oriented decision-making drives group discussions to an atmosphere of meaning-seeking. The consensus-seeking process attempts to build and maintain an attitude of inclusiveness in the groups. A problem-solving process fosters social interaction facilitates consensus-seeking and value participants' ideas (Srivastva and Associates, 1986). These ideas usually are expressed with a desire to reveal their subjective meaning.

Recent theorists have paid attention to the primacy of meaning-making in organizations (Daft, 1989; Morgan, 1983). When unstable, changing environments combine with inconsistent individual perceptions, organizational characteristics should be defined by shared perceptions and shared definitions of organizational reality--a shared paradigm (Pfeffer, 1981). Seeking shared meaning encourages more frequent communication that is more likely to develop common sets of understandings about the policy system and its environment. Dunn (1984) thinks that good problem-solving must consider the interaction of policy and its environment. Because perception is derived from environment, shared meaning helps members understand their environment for policy-making. Shared meaning indicates that there has been sufficient exchange of members'
Behavioral scientists have difficulty determining whether a decision is good or bad (Janis and Mann, 1977). For example, achieving a specific goal may at the same time undermine others. Multiple objectives ought to be considered when determining a course of action for alternative goals.

Decision-making quality depends on three principle phases: (1) finding occasions for understanding contextual demands for making a decision; (2) finding possible courses of action; (3) choosing among possible courses of action (Simon, 1960). Evaluating the ultimate success of a decision requires considering several courses of action and a wide set of values (Janis and Mann, 1977). Any measure of decision quality must examine the quality of the procedures used by group members because of the emphasis on procedural fairness. Thus, a right decision ought to take into account the range of options (Beach and Lee, 1993). By this criterion, decision makers expect to predict whether a given decision is likely to lead to acceptance or rejection, satisfaction or regret.

Janis and Mann (1977, 1979) said" . . . From the extensive literature on effective decision-making, seven major criteria have been extracted that can be used to determine whether procedures are of high quality.
1. thoroughly canvasses a wide range of alternative courses of action;
2. surveys the full range of objectives to be fulfilled and the values implied by the choice;
3. carefully weighs the costs and loss of negative consequences, as well as the positive consequences, that could be attained
from each alternative;
4. intensively searches for new information to concentrate on further evaluation of the alternatives and some different solutions are suggested;
5. correctly assimilates and scans any new information to which decision makers are exposed, even though the new information doesn't support their original preference;
6. the group can discuss the pros and cons of several different alternate solutions to a problem;
7. makes detailed provisions for implementing or executing the chosen course of action, with special contingency plans for predicting the future."

When decision-makers meet all these seven criteria, their orientation in arriving at a choice is characterized as vigilant information processing (Janis and Mann, 1977) that make decisions effective. Otherwise, conflicted ignorance, conflicted inertia, defense avoidance or hyperawareness of time pressure might stifle continuous evaluation and threaten the quality of decision-making. When decision-making groups reach alternatives that meet the seven criteria, they will minimize the misperceptions that undermine immediate objectives and long-term values (Janis and Mann, 1977).

A single valued decisions which is preferred by organizational elitists implicitly threatens decision-making quality. Oligarchic decision-making usually attempts to find a single objective to serve the elitists' preference. This notion of elitist-valued decision-making should be modified in a democratic society
**Group Dynamics**

Organizational life is group life and groups are necessary units of problem-solving is necessary. A group's intelligence ought to effect the abilities for problem-solving more than that of the totality of each individual's intelligence (Swalp, 1984). However, not all groups are capable of making a good decision. How to get members together in order to make a right decision and coordinate members to achieve the set goal is important for increasing an organization's effectiveness and efficiency (Daft, 1986).

In order to understand group characteristics, some basic concepts of group dynamics should be clarified. Homans (1950) defines the social group as group members communicating with each other for some purpose with few enough members so face-to-face communication is possible. Activities, interaction, sentiments and norms were identified as the most fundamental elements of a group's social system (Homans, 1950). Activities are seen as manifest behavior to solve the groups' problems. Interaction is viewed as reciprocal exchange or mutual recognition for problem-solving among members. Sentiments are conceptualized as internal states of a person, such as happy or sad feelings and various beliefs that can be inferred from what people say and do and how they interact. Norms are the rules that people are expected to accept and follow (Napier & Gershenfeld, 1993).

In Homans' model, "practical equilibrium" is the key to explain group dynamics. "Practical equilibrium" is conceptualized as the catalyst for developing the group. When a group is in equilibrium, a
change in one of its main elements (of activities, interaction, sentiments, or norms) would change the others as the group strives for stability. A change in any element triggers a change in the group's internal structure and eventually forms a new state of equilibrium. Thus, before setting a goal, the factors of individual sentiment, group interaction, or written or unwritten rules and the planning of an activity would influence a decision.

Parsons (1953) uses a functional social systems model to explain group dynamics. According to his theory, all groups work to solve four problems: (a) integration, or how the parts of a group fit together as a whole; (b) pattern maintenance, or how the major patterns of interaction in a group are maintained; (c) goal attainment, or how a group organizes and proceeds to achieve its tasks and goals; and (d) adaption, or how a group relates to a changing environment. All group behavior is usually directed toward these four dimensions.

According to Parson's theory, a small group's system becomes stabilized by developing a social structure, which Bales (1953) viewed as "a system of solutions to the functional problems of interaction which become institutionalized in order to reduce the tension which is produced by the uncertainty and unpredictability of others' actions." Bales identified four dimensions of role differentiation as the basic components of a group's social structure. The four dimensions are: (a) access to resources; (b) control over persons or authority; (c) status ranking or social stratification; and (d) group solidarity (thinking and feeling). Thus, group behavior always is affected by both internal structure, individual factors (such as authority), group factors (such as
members' interaction), and the external structure in the decision-making environment (such as organizational culture or environmental uncertainty) that influence decision-making.

**The Causes of Shortcomings of Team Decision-Making:**

**Heuristic Bias**

A team's effectiveness is limited by the judgmental ability of its members. If group members lack necessary intellectual abilities, decision-making may not be successful. A team needs some processes to uncover and frame issues, because the members often depend on their intuitions to identify and describe issues (Mintzberg and Watera, 1982).

Judgments usually are undermined by individual's intuitions. Good judgment requires members who develop mental skill and clear insight for identifying the problem. The process of problem-solving requires more than intuitive capabilities. Heuristic judgment occurs when members search information before making judgments. A heuristic is a rule of thumb that serves to "simplify" decision-making (Brightman, 1988), which can cause the failure of group decision-making, even though a quick decision can be achieved. Watzlawick (1978) criticized "judgments by speed" that make decisions ineffective, because the first thought dominates over other possibilities.
A. Selective Perception Heuristic

Selective perception means members select information that serves their own perspective. Group members who make judgments are easily influenced by their experience, personality or ideology. All issues are interpreted based on a decision-makers' own principles. In other words, individuals tend to select only that information into their own system which can support their perception (Randolph, 1985). Some new information is ignored when it is beyond the individual's preference. This selected information fits a preconceived position and makes it harder to try new solutions (Nutt and Backoff, 1992). Positions are inflexible and revision becomes difficult (Hogarth, 1980).

Bartier found some common systematic distortions in selective perception heuristic (Brightman, 1988), including: (1) Sharpening--decision-makers usually maintain or exaggerate some issues; (2) Rationalization--thinking becomes more consistent with decision-makers' expectations and experiences; (3) Leveling or Flattening--decision-makers usually reproduce usual events.

Selective perception causes decision-makers to level, sharpen, and rationalize. The information developed is not based on justified analysis. Rather, it is based on members' current positions and preferences. Selective perception often makes judgments ineffective, because the errors may be caused by face-saving distortions and rationalizations (Merton, 1936; Weick, 1968).

B. Availability and Representative Heuristic

The "availability heuristic" means decision-makers explore a
problem based on their previous experience which is stored in memory (Hogarth, 1980). Some prejudices derive from individual memory, because they seldom are made public in ways that benefit from rebuttal or new information. Dutton and Jackson (1987) pointed out the limitations of intuitions when they are applied by group members to make judgments.

Tversky and Kahneman (1985) argued that decision-makers like to analyze problems through intuitive judgments, because they can imagine or recall instances from memory quickly. However, the judgments filtered through availability heuristic ignore diverse perspectives that influence a team's abilities for problem-solving. Individual's judgments based on memories generate "vivid information" which is viewed as emotionally or interestingly concrete (Nisbett & Ross, 1980). This vivid information causes members to believe that the information is the most useful. Unfortunately, individual's memories can easily forget some disadvantages about themselves and drive toward self-advantages. Therefore, intuitive judgments generally are only functional for serving an individual in group decision-making. The availability heuristic biases decrease necessary intellectuals for problem-solving.

The "representative" heuristic is another type of bias for judgments closely allied to the availability heuristic (Tversky and Kahneman, 1985). The representative heuristic is explained as basing problem-solving on stereotypes developed from previous categorical rules (Hogarth, 1980). The rule of thumb, habits and categorical rules affect decision-makers, leading to a failed diagnosis. The habits
reinforce members' unconscious bias, which perpetuates the problem and gets group members into a decision trap (Waterman, 1987). Habitual thinking hinders the development of members' mental abilities, because people habitualize their thinking and behavior and narrow their choices (Trice and Byer, 1993; Brightman, 1980). The habit trap has limits most group members' imaginations when a decision requires fresh problem-solving alternatives. Thus, intuitive judgment based on the availability and representative heuristics usually biases a decision.

C: Anchoring and Adjustment Heuristic

The "anchoring" and "adjustment" heuristics also prejudice individuals toward a judgment (Horgarth, 1980). "Anchoring" and "adjustment" heuristics are defined as making judgments about the problems based on initial values and then adjusting all the information to fit the diagnosis. Initial positions become even more extreme to support the problem diagnosis. For example, decision-makers have been asked to assess the salary of new teachers who have just graduated from college and they may assess the starting salaries based on last year's average starting salaries for college graduates, making no allowance for economic changes. The biases of the anchoring and adjustment heuristics occur because a faculty anchor causes data to be adjusted rather than used to create new analysis of the problems.

Stress

Stress and its influences on decision-making appear to influence
decisions in a school system (McCutcheton, 1990). Stress is the set of physiological and psychological reactions of a person to characteristics of the environment that are perceived as a threat (Randolph, 1985). Group members' abilities to analyze issues are influenced by stress. According to Janis and Mann (1977), people are reluctant decision-makers, because making decisions evokes a stress reaction. The primary motivation of individuals under stress is that they tend to avoid the stress and strive to return to normal conditions.

In order to cope with the stress, group members depend on their past experience for avoiding anxiety. However, the hindsight based on past experience is another source of bias (Horgarth, 1980). Group members under stress tend to narrow their visions. "Defensive avoidance" becomes wishful-thinking (Janis and Mann 1977), narrowing the range of vision for coping with the anxiety (Keinan, 1987; Smart and Verlinsky, 1977). This narrower coping strategy can create oversimplification and neglect potentially useful information. Available information is blocked out, and biases of judgment are augmented.

Halo Effect

When group members make decisions, most people believe they make judgment based on facts and information (Napier & Gershenfeld, 1993). They believe that in a particular situation, given specific, relevant information, they can render impartial judgments uninfluenced by their personal knowledge of the people involved.

However, Nisbett and Wilson (1978) describe how group
members usually produce a psychological phenomenon known as the
"halo effect" that derives from "the power of an overall feeling about
an individual to influence evaluations of the person's individual
attributes." For example, a person may disagree with someone's
opinions during a group discussion, but does not challenge that
person's ideas because the other is charming and a friend. The
person's judgment is based on the halo effect. Objectivity is
diminished and the individual's actions may reduce the quality of
decision-making.

The Tyranny of History

When group members try to identify a problem, they frequently
analyze a problem from historical perspectives. Members' histories
influence current perceptions of group members toward their own
world, and the past decisions and experiences affect their current
structure and process (Randolph, 1985). These temporal comparisons
affect problem identification, and the historical effects make decisions
conservative (Kiesler & Sproull, 1982; May, 1973; Milburn, Schuler, &
Watman, 1983). For example, a successful experience of the past used
as an immediate source of information produces doubtful assumptions.

Historical effects have lessened the quality of group decision-
making. Koestler (1941) argues that when a decision based on the past
is inseparably bound with the present and future, the past is identical
with that decision. It appears that history makes symptoms of a
problem unproblematic. Morgan (1986) criticizes groups which may
be trapped by their past success and the quality of decision-making
would be influenced by the “sunk cost” (Simon, 1955) of psychological
dependence. People rely too much on their successful experience and
ignore of unproductive possibilities in the new context. A thoughtful
group process has to transform the weaknesses of historical passivity
into productive problem-solving (Wildavsky, 1979).

I: Personal Factors That Improve Group Decision-Making

Individual Openness Increase A Group’s Ability

Openness is best conceptualized as a characteristic of
relationships, not of individuals (Swalp, 1984), although it is termed
as “individual openness”. Openness emerges when two or more
individuals become willing to question each other or themselves.
Group members become willing to have their thinking influenced by
one another. In a state of openness, group members gain access to
deeper understanding and seek to avoid deception. Patton and Giffin
(1987) suggest that deception and a lack of openness to others
prevent group members’ learning from one another during a problem-
solving process. That is, they deceive themselves when they are in the
act of deceiving others. Watzalawick (1978) stresses the importance of
openness, without which group discussions would produce an infinite
regression of “what I think he thinks I think he thinks...”.

Openness in group decision-making enhances mutual trust.
Each person can express information candidly so that the revelation of
information is not influenced by external forces or internal defenses
(i.e., to avoid pain or threat) (Senge, 1990). Individual openness is crucial as a function for interaction, because knowledge is gained through authentic discussion. March and Simon (1958) suggest that the more frequent the interaction between an individual with other members of a group, the stronger the propensity of that individual to identify with the group; and vice versa.

Prematurely closed groups may be able to arrive at a decision more easily than their more open counterparts, but such a closed arrangement also produces the risks of unfairness, lack of commitment, narrowness of vision, and unsatisfactory decisions (Rubin, 1984). On the other hand, openness is likely to give the group access to different points of view and expertise necessary for successful solutions to a variety of problems.

Openness based on trust creates a mutually supportive climate, rather than a mutually defensive one. Shared problem-solving initiates a climate of description, problem-orientation, spontaneity, empathy, and equality, and reduces evaluation, control, strategizing, indifference, superiority, and certainty (Schmuck and Runkel, 1972).

Creative problem-solving requires thinking outside the scope of one's normal preference (Locke, 1991). Group decision-making calls for an openness of mind, relatively free of restrictive bounds, to permit the discovery of suitable alternatives (Ebert & Mitchell, 1975). Openness avoids artificial contamination of issues, because the opportunity to understand others and one's own true willingness makes people see key issues clearly (Brightman, 1980). Without true openness it is generally impossible to break down the game-playing
that is deeply embedded in a decision-making group. Many group members are proud of themselves on “being open,” but in fact they may play “blaming games” (Mitroff & Pauchant, 1990) to find out who ought to assume the responsibility for organizational disasters or issues. Lindblom (1990) thinks the open communication that makes empathetic communication possibly becomes a major source of democratic viability.

Three different aspects of openness are necessary for problem-solving: participative openness, reflective openness (Senge, 1990), and emotional openness. Unless the three are integrated, individual behavior will not produce real openness that further promotes the whole group’s openness.

Participative openness means the freedom of individuals to speak their mind and to question each other. Of the three aspects, it usually is recognized most frequently by group members. This is “participative management,” involving people more in decision-making (Likert, 1961). However, participative openness does not mean that group members can provide useful information for problem-solving. Sometimes, group openness become purposeless talking; discussions are digressive. For example, “I state my view and you state your view”, but sometimes little real effective information is involved, because group members cannot concentrate on what the other is saying.

While participative openness involves people speaking out, reflective openness involves people’s introspection for questioning their own thinking. Reflective openness starts with willingness to
challenge or criticize one's own hypotheses. No matter how compelling it may be, no matter how fond people are of "their idea," it is always subject to test (Senge, 1990). Reflective openness makes group members hold the attitude, "I or others may be wrong or right and I should do my best to clarify my own or others' thinking." A habitual mode of thinking that all thought should be challenged becomes a useful strategy for identifying problems correctly (Mitroff & Mason, 1983). Because the capacity for ethical decision-making is dependent on the capacity for self-questioning (Lewis, 1990) and on tolerating another's challenge, reflective openness also increases the function of ethical decision-making.

Emotional openness is another important factor for decision-making. Emotional openness involves developing members' abilities to feel and endure even if there is pain. When group members have been emotionnally bound to an identified group, nobody is willing to upset the group climate. However, almost all significant change is likely to upset the comfort of some people. In other words, decision makers usually are not able to feel and endure enough pain to make a change. Decision makers are usually "bounded emotionally", because group members are not willing to sustain enough emotional pain that might produce a temporary loss of self-benefit (Mitroff & Pauchant, 1990). Emotional suffering creates a willingness to do anything to alleviate the suffering except to make a decision to change conditions that cause group members suffering (Watzlawick, 1978). This suffering often produces the vicious cycle of perpetuating the problem.

Love for a group or a decision might eliminate the effect of
"bounded emotion". Love does not simply mean romantic love, but the active development of empathetic communication (Senge, 1990); or the art of "thinking through another's mind." (Koestler, 1941). In fact, love in this context emphasizes a commitment to serve one another, and a willingness to be vulnerable in that service (Senge, 1990). A traditional Chinese proverb states that for the group to achieve, an individual needs to accept a little loss. O'Brien said "the individual only has power as he ceases to be an individual" (Evans, 1993, p.34). Lao-Tsu (1988, p.13, p.23) in his Tao Teh Ching, says "love the group as yourself; then you can care for all things. If you open yourself to loss, you are at one with loss and you can accept it completely." Therefore, love for the group can drive group members to contribute their information and abilities. When group members have a feeling of complete openness among each other, then the meaning can flow and the whole group can work together (Bohm, 1987).

**Personality**

Different personality characteristics may influence group members when they identify a problem (Moreland & Levine, 1992). For example, group members with high self-esteem may show great willingness to diagnose problems because they feel more confident about their problem-solving abilities (Milburn, Schuler and Watman, 1983). However, high self-esteem can also promote many mistakes in detecting problems, because high self-esteem members of the group usually express themselves with overconfidence. That overconfidence can bias the decision (Hogarth, 1980).
Jung's personality theory suggests that group members usually place personal preference on either sensation or intuition in the detection of problems and thinking or feeling in the diagnosis of problems (Nutt, 1989; Mitroff & Kilman, 1978). Jung views individual personality types as a universal reality for decision-making; no matter what the information, a group member processes information based on his/her personality type (Morgan, 1986). This transcendental reality could lead an individual into the trap of unconscious inertia or reification that was termed "false consciousness" by Karl Marx. This "false consciousness" become the dark or negative side of personality called "shadow" (Jung, 1964) that affects a decision. When individuals show natural feeling and emotion, the shadow shows negative intellectualism; it provides negative and poisonous judgment (Jung, 1964). Thus, when individuals identify a problem, they must dissolve the shadow. Otherwise, the shadow can control individual thinking and diminish their abilities. Group members have to integrate the shadow into conscious judgments by just being honest and using their insight. Others' "criticism" in group decision-making makes it possible to release trapped energy in ways that may promote creative transformation and change and create more integrated relations among group members (Morgan, 1986).

Also, the psychoanalyst Freud has focused on the interpretation of the unconscious for problem-solving. Freud divided individual personality into id, ego, and superego. One aspect of relationship between id, ego, and superego and decision-making reality is "repression". The native impulse (id) for advantage often represses
information for effective problem-solving.

From the above analysis, many decisions are made based on the unconscious perceptions. Group members need to develop their capacities to make a better decision through an improved conscious understanding of how they interpret issues, thus leading to enhanced ability to identify critical information.

Responsibility

If group members commit to a decision-making process, their interests and capabilities are assessed. However, members with higher interests and capabilities should be encouraged to assume certain responsibility in decision-making (Patton & Giffin, 1987). General group agreements could be attained when capable individuals desire to serve the whole group and accept more responsibility for their decisions.

Some group members who have interests and capabilities may avoid responsibility in decision-making and implementation in order to decrease their workload. On the other hand, persons who feel responsible toward the group are highly motivated to achieve. Thus, groups can be effective problem-solving entities only when individuals feel responsible for that decision. Dewey (1929) in "How We Think" stresses that group members' feelings of responsibility toward a decision improves individual openness and promotes creative problem-solving.

In the process of interaction, the members who have relevant knowledge should accept the responsibility for contributing to
problem-solving. When people shun their responsibility to implement a decision, their withdrawal can make the entire team's problem-solving ineffective. For example, people may display the attitude that if "I talk too much it means I know more, and, therefore, I will be given more work in the future." The absence of openness becomes an obstruction to the group. Group members should instead show the attitude that "if we have certain abilities, we should be willing to take the responsibility to contribute to the possibilities for organizational improvement."

However, sometimes, decision makers may unconsciously assume responsibility for something that they might not otherwise assume if they took time to reflect on it (Watzlawick, 1976). For example, in Taiwan, a supervisor of student discipline may unconsciously accept responsibility for delivering corporal punishment. If he/she can reflect on whether or not he/she should accept that responsibility, he/she might find it totally unacceptable.

Knowledge

Although the identification of a problem often requires measurable expertise (Moreland & Levine, 1992), people may not be equal in the extent of their knowledge or intelligence. Problems are more likely to be diagnosed accurately by people with higher intelligence and cognitive abilities (Tylor, 1975). Thus, a group cannot accept unqualified statements that "the information in a group exceeds that of any individual" (Maier, 1970).

Knowledgeable persons improve problem detection by help
the group seeing problem symptoms for them (Carroll, 1978; Gilovich, 1981). Also professional abilities could provide group members with a more systematic cognitive schema for improving their understanding how various aspects of a problem relate to one another (Chi, Glaser, & Farr, 1988). However, when unqualified statements prevail in group discussion, knowledgeable persons may not be convinced by the information. On the other hand, while some knowledgeable members can contribute their knowledge skillfully for decision quality, they may impose their knowledge upon persons who may be resistant toward the information, even though it is true and useful. French and Raven (1959) stated that expertise (professional knowledge) can direct group decisions; however, persons with less knowledge may think that they have been ignored or they may feel powerless. They may not express themselves since they think that they are considered inferior; therefore, they are less likely to accept a decision and may decrease their efforts to carry out the decision.

In order to reach consensus, knowledge sharing is very important. Both the similarity of knowledge about the group task or decision area and also the relevance of that knowledge are two significant factors to help reach consensus (Shaw, 1981); because similarity of knowledge can enhance informational exchange among group members, because their information is perceived as credible. For example, a decision group discussing the problems of educational reform might include educators and doctors. The doctors may think that it is not necessary to be involved in the group, because in general, doctors do not have enough expert knowledge about educational
issues, and, furthermore, most of the information is provided by the educators.

If participation is used as a tool for enhancing members' happiness and well-being, then it must be in a context in which people can involve not only their knowledge and ability (thinking), but also their feelings in discussion. Knowledge sharing to promote involvement is indispensable to enhance openness for consensus.

Status

When group members meet together for problem-solving, they attempt to gain information from one another. Some of the information is sought for its own sake for problem-solving; on the other hand, it may be sought in order to understand another's thinking. Status as a variable affecting group interaction probably cannot be overemphasized. For example, the perceived status can affect the interaction of group members by negatively impacting problem identification due to an "opaqueness" of mind that prevents members from acknowledging the relationship between reality and status.

The status effect in group decision-making has been characterized as resulting in a "minimum of consensus and a maximum of confusion" (Patton and Giffin, 1987). For example, because principals control their benefits, teachers may try to determine their principals' thoughts and intentions. In order to flatter the principals, teachers close their minds to telling the truth. When status effects are particularly strong, problem identification not only becomes a privilege reserved for certain members of the group, but also neglect
some perspectives on problems and hinders real consensus. Eden, Jones, and Sims (1979) suggest that acceding to others' status generally means that unexamined information undermines the quality of decision-making.

Some status effects are created actively by a superior himself or herself to demand that other group members obey him/her. Sherif (1961) thinks that the higher the status of a group member, the greater the frequency of demanding others' obedience to his/her propositions. However, some group members may naturally tend to follow the superior's opinions and repress their own emotions and thinking. In order to reveal useful information, a democratic climate in group discussion is very important; the role of the leader is particularly crucial to reduce the force of the perceived status. When group members begin to discuss a topic, the leader ought to create a warm-up session to eliminate the status effect (Robert & Larry, 1988). The leader should say that "no one should worry about the discrepancy of status, and we are eager to get true information to diagnose the problems". When mutual trust has been established, the negative effects of status will not exist any more. Further, during the process of group discussion, high status persons should not behave exceptionally than other group members working with them.

Age discrepancy is another status factor that decreases a group's ability to process information (Shaw, 1981). In the group decision-making process, the opinions of younger people usually are neglected to a greater extent than those of older members. Furthermore, old members usually have an emotion of narcissism toward their reputation
and successful experience that hinders emotional and reflective openness. They are not open to young people challenging them. Young people also can reject valid information if they are biased against older people.

Role

Role is yet another personal factor that can influence the effectiveness of group decision-making. Each position or role has certain behaviors associated with it. Group members in those positions or roles are expected to exhibit those behaviors. Role expectations usually exert a pervasive influence on the perceptions and evaluations of group members for one another. Roles specify the kinds of behaviors that the group member is expected to display, and these specifications may bias perceptions and judgments concerning the group member. For example, in Taiwan, a supervisor from the Department of Discipline may be expected by the tutors to use coercive power, which is to handle students' deviant behavior. Consequently, the tutors can distort and withhold information about students, thereby preventing the supervisor from choosing an option other than coercive power. Therefore, with more information available in decision-making, roles can become less circumscribed and more flexible (White, 1990). Unconscious "role expectations" will no longer dominate members' decision-making behavior.

Motivation

A number of motivational factors may affect consensus in group
decision-making. Locke and Schweiger (1979) propose three reasons that some members have low motivation to participate in decision-making. First, members do not want or expect group decision-making; they lack independence and want to be told what to do (David, 1963). Second, some members are not used to group decision-making (Carroll and Tosi, 1973). Third, group decision-making assumes that members' morale, satisfaction, and performance are enhanced by participation in decision-making; however, some group members who participate in group decision-making may have a low need for achievement or low commitment to organizational goals, and consequently withdraw from group discussion (Fein, 1976). When group members are unwilling to express their opinions in group discussion, the flow of information can become distorted or insufficient. Consensus becomes a remote ideal and the quality of decision-making is threatened. Therefore, when an organization wants to organize a group for decision-making, persons with low motivation should be identified. Before the meeting is held, the leader can use various ways to identify potential members not motivated to participate in decision-making, either to eliminate them from the group or to train them to recognize the importance of participating in group discussion.

Also, an individual's attitude toward a decision-making group is very important for increasing motivation. Therefore, before individuals participate in decision-making, steps should be taken to increase their sense of belonging in the group. Shared attitudes by the individuals in the group toward other group members or the group in general can
increase motivation for involvement in decision-making. For example, trusting the group generally would create a high sense of security in the group and vice versa. Examples of shared attitudes are: (1) individuals can trust the group and others; (2) individuals feel that they are included by the group; (3) individuals feel security that the group context protects individuals, (4) individuals can avoid anxiety toward the group; (5) individuals show the feeling of “facticity” (Turner, 1988), that is, individuals feel that the group really discusses something concrete or authentic; and (6) individuals can value the topic of decision making. These motivational factors would help the whole group energize and improve their communication and the flow of information.

**Autonomy**

Autonomy for the individual in decision-making groups most often fosters creativity that is essential for a change in decisions (Czarniaw ska-Joerges, 1988). Autonomy provides group members with opportunities for self-development and for preserving human dignity. Without autonomy, the group climate becomes rigid and obsolete, and individuals become alienated and apathetic to their groups.

People often value group decision-making because it fosters a spirit of self-determination in their organization. Dahl (1984) proposed that maximized self-determination for decision-making can integrate the values of liberty and equality: When the two values are emphasized in group decision-making, decisions are usually accepted by the group members. Also, self-referential decision-making that
stresses maximized self-determination can enable individuals to confirm what they really want to know (Smith & Berg, 1987).

Autonomy signifies that group members have the autonomy to express themselves and that they are not imposed upon by external factors. The flow of diverse opinions may create a climate of confrontation, but problem-centered diagnosis of information becomes possible.

Of course, group members must carefully note the following qualification: maximized autonomy must be extended to all members of the group, not just a single person. Leon Festinger's (1964) theory of cognitive dissonance indicates that once a person has overcommitted himself or herself, inflexible biases are produced. For example, there may be zealots in groups who cannot compromise on a certain issue (Backoff and Nutt, 1986). These zealots' self-righteousness could threaten maximized self-determination for other group members, because they will use any means they can get away with to carry out what they believe is right, desirable, or needed to prevent a challenge to their beliefs. The persistence of strong self-preference could undermine the group climate of maximized self-determination and should be avoided (Nutt, 1989).

Tobert (1976) has proposed four “intuitive axioms” for personal practice of an action-oriented science. His second axiom holds that a capacity for higher thought that seeks problem analysis through inquiry cannot be accomplished without other people (Mitroff & Kilmann, 1978). A zealot who does not leave room to respect others’ points of view might weaken the group’s capacity for higher thought.
Wilber (1979) also thinks that the development of individual mental abilities from the stage of mind into the state of spirit cannot be achieved without dialogue. A zealot has deprived the group of its possibilities for dialogue.

Furthermore, group members should not play the role of “dirty hands.” Dirty hands are defined as group members who, as tools of top management, advocate the self-serving interest of their superiors or top management (Nutt, 1989). Nutt also suggested that the logical consequence of “dirty hands” are decisions that ignore ethics. Subordinates are motivated to use any means necessary to serve those in positions above them. When members feel that others have “hidden agendas”, consensus is very difficult, meetings can be seen as manipulated, and mutual distrust and suspicion can quickly develop (Jessup and Valacich 1993).

Group decision-making can also be affected by three kinds of individual behavior: self-indulgence, self-protection and self-deception (Nutt, 1989). Self-indulgence means that personal gain underlies one's choices and ethics. Self-protection means that decision makers are constantly thinking about whether or not their choices and behaviors make them vulnerable to a loss. Many people may fear that speaking too much might influence their career ladder. Another inhibitor is self-deception. Some people play an “advocate role” or buy into a superior’s agenda that becomes part of their own belief system (Nutt, 1989). For example, people may play politics to influence others to believe a certain assumption. These three behaviors that lack openness also undermine group decision-making.
II: **Group Factors Influencing Group Decision-Making**

**Rational Argumentation For Promoting the Group's Abilities**

Mcneil (1986) described some characteristics of human groups as follows:

All human groups like to be flattered. Historians are therefore under perpetual temptation to conform to people they write about as they wish to be. A mingling of and falsehood, blending history with ideology, results... (p. 12)

Yet we cannot afford to reject collective self-flattery as silly, compatible error. Myths are, after all, often self-validating... (p. 13)

When it can move toward what ought to be, be given collective commitment to a flattering self-image... (p. 14)

Belief in the virtue and righteousness of one's cause is a necessary sort of self-delusion for human beings, singly and collectively... (p. 14)

Where to fix one's loyalties is the supreme question of human life, and is especially acute in a cosmopolitan age like ours when choices abound. (p. 15-16)

To be a truth-seeking mythographer is therefore a high and serious calling, for what a group of people knows and believes about the past channels expectations and affects the decisions on which their lives, their fortunes, and their sacred honor depend... (p. 21)

When human groups are formed to collectively solve human problems, they have a natural tendency to act irrationally. Janis (1972) pointed out that a group norm influences decision-making in a negative way which he terms “groupthink.” Usually, the dominant group's stereotypical assumptions influences group members'
thinking, because they tend to support existing norms.

Another example serves to illustrate that a decision-making group tends to act irrationally. Problems caused by dynamic environments usually become complicated as people try to cope without sufficient information (Cohen & March, 1976). Group members tend to solve these complicated problems by an evoked set of immediate decisions (Jervis, 1976). Members solve problems based on what they can handle immediately. The “Garbage Can” model which encourages an instant solution was developed to explain irrational decision-making (Cohen and March, 1972). Yet, instant solutions are only pseudo-solutions to problems not fully analyzed (Bennis, 1976). Instant solutions also involve “cultural heuristics” (a purpose sanctioned by organizational culture) or “political heuristics” (a purpose of self-interest) (Summer, 1980) that make solutions ineffective. The impact of additional analyses is to sensitize members to the prejudice of making quick irrational judgments (White, 1990).

Thus, rational discussions associated with particular issues are vital because the process always slows down decision-making. Lindblom (1990) emphasizes that debate for decision-making is viewed as democratic. However, if the arguments are not based on rational analysis, the decision-making process would produce a "democratic overload" that threatens decision-making. As a consequence, effective decision-makers require good, reasoned means for decision-making (Freely, 1990). Toulmin (1958) use the term rational argumentation which is effective for surfacing different assumptions about controversial issues to improve the quality of
decision-making and achieve genuine consensus through critical thinking.

Rational argumentation as a basic factor in group decision-making fosters better decision analysis. Group members exchange information by logical and reasoned justification to solve issues. Rational argumentation is also a method of systematizing doubt (Mason & Mitroff, 1981). Four characteristics are used to reveal the meaning of rational argumentation. First, group members make underlying explicit assumptions. Second, raising questions and issues toward different positions is considered. Third, members provide evidence and show arguments for and against each position. Finally, group members must desire to arrive at some final conclusion. White (1990) stresses the significance of rational discourse since it gives up imposition and favors proof. Members never blame and condemn others, but try to provide useful data and evidence to deal with controversial issues.

Rational argumentation occurs when a controversial issue is examined systematically and logically from two or more points of view. However, reasons for synthesizing different viewpoints cannot be detached from the end or purpose (Varoufakis, 1991). The final judgment is improved by clarifying any assumptions and synthesizing the issues toward a common purpose.

Rational argumentation also provides the synthesis of opposing viewpoints. Sometimes, the contradiction between two defensible interpretations of an issue creates a paradox. The opposing interpretations may be mutually exclusive, but eventually are
synthesized to offer new insights that are missing when controversial issues are viewed separately (Cameron, 1986). Thus, rational argumentation produces strong claims and counterclaims which generate creative tensions to reach a solution (Mason and Mitroff, 1981). When decision-makers deal with controversial issues by ignoring some of the assumptions, it is difficult to make decisions successful (Cameron, 1986). Rational argumentation makes the claim of reason and justification to incorporate generalizable agreements that are successful for consensus.

Effective team problem-solving should not be influenced by a single assumption (Toulmin, Rieke, & Janik, 1984). Rules ought to be flexible for a group in order to help members develop abilities to solve a variety of problems. Rational argumentation views rules as flexible. It focuses on analyzing different assumptions as opposed to the reification of certain assumptions. On the other hand, it is a kind of advocacy which seeks reasoned judgment. Rational argumentation sees all group members as "devil's advocates", who may cause the underlying causes of problems to surface (Bennis, 1976). Through critical evaluation, decision makers understand the strengths and weaknesses of each alternative action and then select the most acceptable one to address the context.

Rational argumentation should be a public examination process among group members. Wherever an idea or thought comes from, it can be examined or criticized "rationally" when the climate of collective criticism is encouraged (Freeley, 1990). The term "argument" does not mean a hostile flow among group members.
Rather, it means a desire to achieve understanding based on supporting proof and data. This process attempts to arrive at the most effective conclusion.

The decision-making process is concerned with how people share their ideas and thoughts in various situations. One must ask: Are many of our thoughts worth sharing? Aristotle lists four values of rational argumentation in effective group problem-solving (Freely, 1990). First, it prevents the triumph of fraud and injustice. Second, it is a method of mutual instruction. Third, rational argumentation makes group members see both sides of a viewpoint. Finally, rational argumentation reveals individual meaning and value.

Toulmin (1958) presents a framework for the structure of rational argumentation (Figure 1). The model is a structured way of exploring complex linkages among various policy assumptions. Toulmin describes arguments basically as the movement from accepted data to a claim through what he terms “warrant”. Then, a rebuttal process utilizes the counterclaim to test whether the previous claim is valid. The structure of rational argumentation consists of five parts: claim, data, warrant, backing and rebuttal. The chain of arguments links all the five elements (Mitroff & Mason, 1983, Toulmin, Rieke & Janik, 1984; Freely, 1990).
Data---------------------------------- Claim
|                                 |
|                                 |
|                                 |
Warrant                           Rebuttal
|                                 |
|                                 |
Backng                            

Figure 1: The Structure of Argument

Claims
In the first step, when group members engage a controversial issue, some “target” or “purpose” is always the basis for looking for evidence which group members may locate themselves as a “discovery”, or locate with somebody else as an “assertion” (Toulmin, Rieke, & Janik, 1984). Claims are not constructed by external or absolute standards; rather, they are an appeal produced by the justification and are always of a potentially controversial nature.

Data
In the second step, after having clarified the claim, group members must be able to provide concrete information to support the claim as acceptable, solid and reliable. Data consist of the facts presented by an advocate as grounds for the claim (Brightman, 1988; Mitroff & Mason, 1983). It represents the evidential support for the claim. Data may be factual statements or claims from other arguments.
**Warrants**

In the next step, group members must check whether these data really do provide genuine support for the particular claim. It prevents irrelevant information from affecting the claim in question. This step is to identify evidence which can explain a particular context suitably. Warrants, as rules, principles, standard or inference licenses, are used as a bridge between the data and the claim (Toulmin, Rieke, & Janik, 1984).

**Backing**

The backing provides additional evidence and reason to support the warrant. Every warrant, no matter how strong it may appear on the surface, always rests on certain self-evident background truths or assumptions. A backing normally appeals to some established or generally accepted categorical statement of fact that supports the warrants.

**Rebuttals**

When a conclusion has been reached, group members need to make further analysis of the scope of application. Usually, exceptional circumstances might undermine the supported arguments. In this case, rebuttal is functional. Rebuttal serves two functions (Mitroff & Mason, 1983). First, it creates a safe climate for group members. Group members have an opportunity to speak out. The second function of the rebuttal is to identify outstanding challenges and objections to
the argument that come from opponents of the argument or advocates for other policies. A third function is to identify faulty logic or weak point in the data and warrants that support the decision.

Chains of Arguments

According to the above description, single arguments have been considered, and taken one at a time. In practice, any argument is liable to become the starting point for further argument; the second argument tends to become the starting point for a third argument and so on (Toulmin, Rieke, & Janik, 1984). In this way, arguments become connected together in chains. When the chains of rational argumentation surface for wide discussion, more values can be considered and sufficient interaction usually leads to modifications that foster group acceptance of a decision.

From any one claim, reasoning can provide a proof either forward or backward (Toulmin, Rieke, & Janik, 1984). Group members may be so confident in their acceptance of a claim that they will think forward quickly to its next justification. On the other hand, they might present serious doubts about the claim being justified. Thus, they have to look back at its foundational claims. In the sense of chains of rational argumentation, any claim can be considered the product of a series of preceding and potential justifications (Toulmin, Rieke, & Janik, 1984).

The argument chain proceeds to attain objective knowledge for problem-solving. Argyris and his colleagues (1985) argue that the conditions of objective knowledge should include refuting justification,
intersubjective agreement, explicit inference, and occurrence of public testing. Rational argumentation plays an important role in attaining objective knowledge through interpersonal instruction.

**Communication Ethics**

In group decision-making, communication helps the members understand each other and exchange information. Effective communication includes shared understanding. Members' intentions are decipherable among each other and they can come to a basic understanding of the world. Two types of communication have an impact on group interaction. One is one-way communication; another is two-way communication. One-way communication is a speech act that is initiated at one point by a speaker and terminated at a second point with the listener (Schmuck and Runkel, 1972). The listener cannot give feedback to the speaker. However, the listener and the speaker may interpret the same message differently. One-way communication can produce misunderstanding and confusion. One-way communication emphasizes the speaker's intention and ignores the listener's response. It cannot respond to listeners' thinking by questioning the message of the speaker and sometimes the listeners might feel imposed upon, but the speaker does not know.

On the other hand, two-way communication is a reciprocal process. Each participant initiates messages and each attempts to understand the other. Two-way communication is necessary because the process is cyclical and equalitarian (Schmuck and Runkel, 1972). Habermas (1970) supports two-way communication by pointing out
that communication about individuals may be distorted by forms of inequality and domination. Also language used in a dominated context of communication to describe an issue can also have a biasing effect (Staw, Sandelands, and Dutton, 1981). Two-way communication which encourages empathetic interaction avoids distortion. Through face to face interaction, many misunderstandings can be resolved using complementary gestures along with the message.

In communicative action, Habermas (1970) argues that the minimal criteria for justice is derived from communicative rationality. Habermas lists several features of undistorted communication that can enhance the mutual acceptance of group members for a policy. They include: (1) gestures that are non-contradictory; (2) communication that is public and conforms to a cultural standard; (3) language that is used should enter into a speech-act-imminent obligation to prove trustworthy (Habermas, 1979); (4) communication that leads to intersubjectivity and the ability to create shared collective meaning. The speaker and hearer, through the acts of non-locution, attempt to establish a relationship in order to come to an understanding of each other. The communicative act always implicitly appeals to and requires testing against the opinions of other group members based on undistorted communication and rational persuasion (Bernstein, 1985).

Persuasive language of mild voice can decrease the distortion of communication. Persuasion can be defined as "the display of judgment in such a way that those exposed to it have an opportunity to become aware of the potential value of accepting it in place of their own" (Gilman, 1962). When individuals communicate with others, their
position in reality should not be absolute. They should permit each other to reconstruct the internal relationship. For example, an individual's construction of another message may be laden with value heavy. It may be culturally different, biased, and antagonistic as well.

In order to promote the understanding of communication, a "validity claim" is necessary. In communication practice, a validity claim as the presupposition must be mutually and reciprocally recognized (Habermas, 1979). According to Habermas', "validity claims" to justify the issues of a policy would be helpful for people to agree on policy analysis and increase the credibility that is termed as "universal pragmatic." Each participant can raise a "claim" that is critical, this is termed the "double contingency process" by Parsons (Habermas, 1987). The "validity claims" are: (1) communication should be the most effective and efficient means for attaining an end; (2) communicative behavior is correct and proper in accordance with relevant norms and cultural standards; and (3) the subjective experiences as expressed in speech acts are sincere and authentic, and can represent the true intention of communicators. Authentic communication at the level of propositional content should be integrated with authenticity that orients the communicators toward understanding.

A proposed policy can be accepted in an actual argumentation by all the people who are potentially affected by that policy. In other words, a policy should satisfy the interests of each participant in the argument. Justifiable decision-making usually incorporates "generalizable interests" in the organization (Thompson, 1984) and
achieves an ultimate fact of reason (Habermas, 1973), which says that "communication is ethical."

**Groupthink**

Group cohesiveness depends on members who intend to maintain group membership. Cohesiveness increases as members become attracted to a group. Greater cohesiveness produces more pressure for unanimity of a group position. Often members fear deviating from their group's norms. Janis (1972) argues that cohesiveness can lead to "groupthink" which limits the capabilities of rational justification for problem-solving, because groupthink leads to individual beliefs or values that are adapted to conform group pressure. This adjustment-oriented value that suppresses the individual's real value is called a "pseudo value" (Rockeach, 1973). Members suppress or repress their personal beliefs and criticism of others' ideas to allow the group to reach agreement with minimal conflict and questioning.

Lewin (1951) thinks individuals' psychologically commit to a norm which is described as a "freezing effect". It often promotes decision-makers to resist subsequently effective cues. Self-rationalized group behavior ignores external voices and fosters intergroup conflicts, thus making decisions ineffective. The homogeneous dispositions of group members also ignore other stakeholders' positions (Mitroff, 1979) so that the decision becomes unethical.

Group norms are changed via the critical evaluator, impartial leader, and multiple groups methodologies. These interventions all help prevent groupthink (Nutt, 1989; Janis, 1972). First, with the
critical evaluator technique, a "dyad" confrontation between the critical evaluator and other group members always stimulates group discussions. It produces a useful dialogue to relax group members' tensions and pressure when their ideas might deviate from a traditional group norm. In other words, the critical evaluator effects a healthy atmosphere to nullify the group members' embarrassing emotion, when some ideas might be against the group doctrine. A successful critical evaluator usually provides a group with the service of raising objections and doubts. Also it can make other groups express their opinions less digestively, because people always appreciate having their ideas identified by others. When group members try to explain a phenomenon, they often carefully organize their thinking to avoid a naive defense toward the questioning of the critical evaluator.

When an internal critical evaluator is not available, outside experts (consultants) may be able to promote rational argumentation. In recent organizational development literature, the consultants not only are viewed as "facilitators" to initiate rational argumentation, but they can play the role of an advocate. Interrogation and interjection can diminish group norms to rationalize members' biased behavior.

In addition, an impartial leader may sway the resident meaning that is created by a long-term leader's authority. When a leader attempts to have others follow him/her in order to go through his/her volition, a group is likely to be unconsciously directed toward the leader's preference unconsciously.

Furthermore, multiple groups can prevent a single group's bias produced through its own group norm. Multiple groups produce a
complementary effect in problem-solving. When decisions have considerable importance, a group might be divided into different sub-groups with different leaders, then each of the sub-group members are asked to consider the options and make a recommendation. When these sub-groups return to the main group again, an existing norm may be challenged and a new approach for problem may be identified. Another tactic is "second chance" sessions, where group members try to rethink the decision that creates new doubt. The second-chance could dissolve a premature norm in ways that would improve decision-making.

Interpersonal Conflict

The group problem-solving process cannot avoid producing interpersonal conflicts (Bales, 1953). However, conflicts do not necessarily lower decision quality (Locke and Schweiger, 1979). Conflicts, such as cognitive conflict (in which different perceptions of people surface toward issues) and affective conflicts (in which) persons show different attitudes toward each other, may obstruct the consensus in group decision-making because conflicts imply disagreements with each other. The conflicts often create interpersonal obstacles. Obstacles involving interpersonal conflicts among group members generate a destructive offense and a mutual defense. The disruption usually is induced by the individualistic, competitive motivation of group members (Collin,1964). The absence of rational dialogue to enhance members' conscious communication in group intervention creates a vicious cycle. It appears that the
expressed language only is used solely to promote one's own position and not to seek the truth.

Brown (1983) proposes five different patterns of perception and interaction for solving interpersonal conflicts. They are bargaining, escalation, withdrawal, suppression, and problem-solving. According to Walton and Mckerise (1965), group members engage in bargaining when they respond primarily to conflicting interests. Thus, bargaining involves distrust and a distorted information exchange. It appears that when this type of bargaining pattern is utilized for solving conflicts, consensus decreases (Brown, 1983).

Escalation and withdrawal also hinder consensus. Escalation produces too much conflict that in turn hinder interpersonal relations. An uncomfortable climate created through escalation influences the members' identification with the group and inhibits decision-making. Withdrawal involves avoiding different viewpoints to analyze a problem. For example, in a decision group, the minority may feel unable to challenge the majority. In general, minority members are unwilling to discuss differences. Persons who broach problems are reassured or politely ignored; the person's happiness with the status quo is perpetuated in ignorance of the other's dissatisfaction; and persons in the minority eventually come to believe that total withdrawal is the only response for their lack of power. Lack of conflict obscures the lack of respect for the minority, which of course, makes consensus impossible.

In addition, the type of suppression denies the existence of conflicts. Suppression of conflict reduces the flow of information and
perpetuates myths and stereotypic perceptions of other parties or persons (Brown, 1983). Resistance to fair treatment is unavoidable, because suppression means absence of challenge to the hegemony of the majority. Suppression sees a decision as an "eliminable imperfection". Members ignore their "genuine" needs which a "rational communication" group should identify.

In contrast, the problem-solving pattern often involves trust, open and accurate exchange of information, and a desire for cooperation (Brown, 1983). All the information is provided and exchanged during the problem formulation and the problem solving. Trust eliminates a need for deception during problem identification. The "problem-solving" pattern is useful for solving interpersonal conflicts, because a desire to solve the problem requires viewing conflicts impersonally. Conflicts are viewed as a desirable process for collecting a wide range of information. Trust and friendliness, which promote consensus are derived from rational communication to support useful information and increase the quality of decision-making (Schmuck and Runkel, 1972).

Finally, confrontation can be used as the conflict-resolution style (Duncan and Weiss, 1979) that reinforces Brown's problem-solving pattern for solving interpersonal conflict. Confrontation means that the parties involved in the conflict identify the causes of conflict and are committed to problem-solving to find a mutually acceptable solution and then work together to implement that solution. In other words, a win-win philosophy is utilized in group discussions and the win-lose philosophy (which produces irrational competition) is seen as
a serious inhibitor. For example, in win-win confrontation, rational argumentation creates a peaceful climate for group discussions, and group members no longer fear that they will lose something because all the members are winners.

**Ideological Conflicts**

Ideology is defined as a set of belief systems which influence decision-making (Guess, 1989). Ideology usually rationalizes members' decision-making behavior. It directs people's thinking and infers the analysis of decision-making. Ideological conflict easily leads to destructive conflict and produce uncompromised rivalry. Its characteristics show the incompatibility of informational exchange between members. That is, ideological conflict is a conflict of fundamental assumptions. It occurs easily, particularly, when each ideology is formed in a culture of satisfaction that is contained in certain very deep-seated human needs. For example, two competitive ideologies that are "power hungry" find it difficult to attain a harmonious political agreement.

When ideological conflicts occurs in group decision-making, the information produced is irrelevant to key issues necessary for deciding problems. People just try to look for advantageous information for serving their own ideologies, and which are not focused on the problem. Ideological conflicts make it difficult for group members to see others' opinions as useful. Cooperation for implementing a decision among group members is very difficult. The establishment of ideological boundaries does not permit acceptance of the other sides'
position. When ideological conflicts are created, each ideology leads to a “projective ideology” (Guess, 1989) that perpetuates criticism of another’s beliefs and values.

Some approaches are available to solve ideological conflicts. First, discretion of choice is useful, and common goals have to be used as the role of mediation for coordinating the conflicts. Second, the philosophy of “logical incrementalism” (Quinn, 1988) may be effective because, usually, an ideology cannot serve different stakeholders. “Logical incrementalism” as a decision strategy, suggests that an action can create only small changes. The small change does not challenge any interest. Also, the confidence and good faith in decision-making groups may be maintained by what Meyer & Rowan (1977) call a “logic of confidence”. The “logic of confidence” avoids reconciling issues by overriding conflicts.

The feasibility for implementing two or more different issues in order to improve an organization becomes the bottom line in considering both consensus and the quality of decision-making. Contradictions or ideological conflicts, which may also give rise to demands for ideological change, can be reduced by rational argumentation (Anthony, 1972). However, the theory of rational conflict is only possible when group members can escape from institutional constraints (Varoufakis, 1991). On the other hand, the absence of external constraints is a necessary condition to develop rational debate for creating advantageous conditions for “logic of confidence”, “the philosophy of logical incrementalism” and discretion of choice.
Meyer and Rowan (1977) argue for the use of "decoupling" to solve ideological conflicts. Decoupling acts to create sub-ideologies which reduce the extent of internal contradiction and conflict among group members. For example, when the Taiwanese government discusses political issues associated with an ideology of unification or independence, destructive conflicts always occur. When a sub-ideology of concern of all Taiwanese welfare is created, it becomes an effective superstructure to reduce political struggles. Rational discourse accelerates the development of the superstructure as a new assumption for the policy under consideration. Rationality and dialogue strengthen the resolution of ideological conflicts and makes decisions more effective.

Group Size

The number of persons in a group has several important consequences for interaction during a decision-making process. Small groups are best for evaluating and judging (Nutt and Backoff, 1992). A small group encourages equal participation, which is important in making judgments and assessments. However, the attempt to influence is reinforced in small groups because those who are influenced can naturally induce "power competition" (Backoff and Nutt, 1992). An extremely too small group may not be able to provide sufficient information or ideas to diagnose the problems.

Optimum abilities, knowledge, and skills are available for problem-solving as the group size increases. Also a large number of intellectuals are available for acquiring and processing information
(Shaw, 1981). The large group size is desirable for acquiring enough information and being representative of different interest groups. However, a large group size also produces negative effects on group decision-making. For example, as the size of the group increases, the less opportunity each person has to participate in discussion and express his or her opinion. In a large group, some opinions can be ignored. When they cannot express their opinions completely, those who feel alienated in their group may oppose the decision. Hare (1952) emphasized that as the size of the group increases, a larger proportion of group members participate less than their "fair share." Cartwright (1960) reported that as the size of the group increased from 14 to 16, the total amount of discussion in the group decreased.

Large groups require more time to make judgments than do smaller groups (Nutt & Backoff, 1992). When there is not enough time for problem-solving, a group climate reinforces irrational decision-making. Also, because of the lack of time related to larger group size, the group's activities can be dominated by one or a few members (Bales, 1953). O'Dell's (1968) research in group discussion indicated that as size increased, group members showed (a) greater disagreement, (b) greater antagonism toward others, and (c) greater indifference toward the discussion. Shaw (1981) concluded that the larger the group, the greater the difficulty in achieving consensus. Also, in an extremely large decision-making group, the group is naturally divided into different sub-groups which become antagonistic. As a result, hot conflicts are unavoidable. These hot conflicts dissatisfy group members in ways that usually eliminate a "participation effect"
The most serious problem is that in a large group, information may be lost because some group members are unable to assimilate or digest it (Nutt & Backoff, 1992). Lost information causes errors and misjudgments that would make decisions ineffective. Sensitivity to other's points of view decreases as group size increases (Collins and Guetkow, 1964). Delbecq (1968) finds that large groups must pay attention to many viewpoints, considerable computational variability, greater psychological concentration that are beyond the capacities of most group members. In order to promote rational argumentation to clarify different assumptions, 5 to 12 persons seem optional (Robert & Larry, 1988).

Leadership

Agreement on leadership will produce satisfaction in group decision-making (Collin,1984). Effective leadership encourages group debate. If a leader always attempts to suppress another person's opinions or ignores them on purpose (even though he/she has good knowledge), a resistant climate will be generated in group discussions. Or if a leader clearly knows a good solution, then he or she may properly assert his/her knowledge. But, it is necessary to pursue others' opinions and understandings. Such a procedure would not be authoritarian but democratic. Also, a knowledgeable leader should pursue the group's acceptance through "soft communication" and "reasoned explanation." When people still do not agree on the solution preferred by the leader, the group discussion should continue because
a thoughtful judgment cannot be reached without others' support. If a blind spot in the leader's thinking is found, the leader should adjust his/her own attitudes. With rational communication, a leader helps group members clarify their blind spots.

Lewin, Lippit, and White (1960), classified three styles of leadership: democratic, autocratic, and laissez-faire. Maier and Sashkin (1971) found that democratic leadership led to better decision quality because democratic leadership encourages group members to express and consider conflicting points of view (Locke, and Schweiger, 1979). In general, in groups with autocratic leadership, the group climate could be apathetic or aggressive, because members look with of hostility or flattery toward the leader. On the other hand, group members in democratic settings tend to engage in more spontaneous "confidential" exchanges than those in groups with other kinds of leadership (Nixon II, 1979). The French proverb "I must follow for I am their leader," describes an important feature of democratic leadership.

Also Stogdill and Coon (1975) propose a leadership model of which two dimensions, consideration and initiative structure can be applied to group decision-making. Usually high initiative structure and high consideration are effective for group discussion, because this style emphasizes both personal attraction and focuses on problem issues.

A group may be comprised of different factions or subgroups. Thus, the leader's role as coordinator is necessary if the group members are from different departments or units because
coordination between subgroups becomes more complex in group decision-making. When a leader plays the role of coordinator, at least three characteristics should be stressed. First, the leader needs to understand and share some of the goals of decision-making and the orientations of the different subgroups. Second, the leader has to be broadly trained technically so he/she can talk the language of the different sub-groups. Third, the leader needs to exert influence on the basis of his/her expertise rather than through formal power. The three roles of a leader in group decision-making emphasize the importance of "communication ethics" to increase rational argumentation.

**Types of Participation**

Different types of participation can initiate different motivations for becoming involved in the group discussion. Alternatively, some types of participation hinder rational argumentation. In general, four types of participation are applied to school settings (Nutt, 1989). First, token participation is one in which group members do not have the right to make a decision. Group members only play an advisory role. When the persons who have the right to make a decision look for advice, only then do group members have the opportunity to express their opinion and share their information. In the second, delegated participation, people have the right to be advisors and can actively provide ideas to true decision-makers. But they do not have the right to make decisions. The third, complete participation, gives the group members limited areas of policy to preside over. The last,
comprehensive participation, authorizes group members to make all decisions. The best approach to increase decision-making quality and enhance consensus is comprehensive participation (Nutt, 1989). In this type of participation, the climate of rational argumentation should prevail during problem-solving.

III: Environment for Decisions

The environment for decisions usually consists of two parts: (1) purpose and (2) the physical world which includes the social world, and external circumstances (Barnard, 1960). External influences on the decision environment include the organizational culture and the ambiguity and uncertainty of the external environment (Nutt, 1989). Since the perception of group members creates the process by which people attribute meaning to external phenomena (Randolph, 1985), the environment of a decision-making group usually influences the group's ability to diagnose problems and attitudes shown during group interaction. The organizational environment has intended and unintended forces which influence and are influenced by decision-related behavior (Mitchell & Ebert, 1975).

Obviously, decision-making behavior is assumed to influence or be influenced by its environment. For example, different organizational cultures or characteristics directly impact on decision-makers' behaviors differently (Brightman, 1988; Owen, 1984), because organizational culture provides norms which govern the employee's attitude and influences decision-making behavior. Culture provides
"homogenizing influences" for the individual, so organizational beliefs, aspirations, attitudes toward decision analysis, orientations toward group behavior, and the perception and interpretation of reality become internalized (Thompson, 1967). When organizational culture emphasizes top management, group decision-making may not be effective because people believe the process to be superfluous. Yet when an organizational culture encourages employees to share information in order to solve work-related problems, an effective institutionalized behavior is carried into group decision-making and problem-solving.

A. Organizational Environment

**Bureaucracy as A Decision Environment**

Basiclly, decision-making in a bureaucracy is indirect because of the division of responsibilities and the hierarchical command linkages. This is in contrast to an understanding of shared decision-making for dealing with organizational problems. Max Weber (1947) advocated bureaucracy within organizations in order to promote efficiency of performance. With bureaucracy existing in the environment of a decision-making group, prejudiced information prevails among group members and makes decision-making ineffective.

In modern organizations it is hard to escape from the bureaucratic structure. Characteristic of the rigid hierarchical structure is the inertia of decision-making called the bias of
"representative heuristic" due to categorical rules (Diesing, 1989). Hierarchical structure is considered as prescriptive and destroys the spontaneity for exploring problems (Schon, 1983). Diverse assumptions usually do not surface and some interests are repressed or suppressed and ignored in a hierarchical structure which intertwines interpersonal relationship with bureaucratic rules. The hierarchical structure reinforces the sedentary effects of organizational assumptions and individual meaning and stifles a desire for change.

Hierarchy is defined as containing authority relationships in the organization (government, school system, etc.). In a structural sense, it means that superiors are legally empowered to make decisions and arbitrate issues that are binding on subordinates. Superiors control a system of punishments available to induce a subordinates' compliance. The punishments may strengthen economic compliance, but increase political antagonism.

As visualized in Weber's description of the bureaucratic form of organization, hierarchy is an arrangement of positions into superior-subordinate relationships. The power structure is coercive and dominant that consequently it cuts off human communication and creates barriers for people's empathy and understanding (Kreisberg, 1992). When the bureaucratic power structure affects in group decision-making, the impersonal nature of rules subjects all the subordinates to impersonal communication. Hierarchical rules that are irrelevant to problem diagnosis work against creative problem-solving.

Attempts to limit superior authority may result in voluntary
absences among subordinates. Mandatory participation constitutes acceptance of the legitimacy of superior authority. This legitimacy usually inhibits higher aspirations which can transform an organization.

Hierarchical authority hinders the identification and flow of true information in a vertical communication system because people instinctively protect themselves from pain and threats, through a process called "defensive routine" (Argyris, 1985). Hierarchical authority mobilizes bias through the entire organization (Clegg, 1979). Clegg said that, in hierarchical communication, people who have the authority are unwilling to release their authority and subordinates are not willing to share the complete truth with the superiors.

The underlying norm on which the bureaucratic model of organization is based, is known as "instrumental rationality." The goals and purposes of the organization are established by hierarchical leaders. This causes low creativity the participants who may begin to feel that any discussion will be superficial and meaningless. In bureaucratic organizations, the practice of separating ends from means is assumed. Laymen in the organization are given little choice in determining the means. The organization views having "laymen" lead "experts" as dysfunctional.

Bureaucratic thinking hinders lateral communication. Applying the concept of "policy space," it is clear that every department's policy overlaps the other departments' tasks (Downs, 1967). However, members in a given department only consider that the policy is implemented in their area of responsibility, and they ignore the
impact of the policy on the whole organization. Senge (1990) described "this as a learning disability of the "I AM MY POSITION". Kanter (1983) says that bureaucracy is a kind of segmentism. Departments or persons concentrate on policy concerning their departmental responsibility, and they are unwilling to test the common reality beyond their own department or positional boundaries. Wildavsky (1979) criticizes bureaucracy when the organization cannot correct its behavior by learning from error or failure, and when it continues to ignore the common purpose. Thus, bureaucracy cannot ever satisfy either the needs of the organization as a whole or any of its parts. The organization's self-centered thinking hinders self-development and decreases motivation for learning.

With its high emphasis on control (Quinn, 1988) bureaucracy always resists innovation (Kanter, 1982). Bureaucratic organizations find inertia to be a major roadblock inhibiting change, thus creating a preservation-transition tension (Nutt & Backoff, 1992). Bureaucratic momentum produces tensions-filled activities, when organizations need change. However, the tension reinforces the organizational inertia and suppresses innovation. Thus, liberals sometimes describe bureaucrats as cautious, conformist individuals who are loath to take risks. Conservatives sometimes describe them as zealous empire-builders determined to expand their power at high cost to the public (Wilson, 1989). Common to both descriptions is the emphasis on exercising power and avoiding responsibility (Nadler, 1992). Calder and Schurr (1981) are opposed to organizational control by bureaucracy because members never provides an instantly
advantageous schema or the right conditions for group interaction. Fundamentally, the characteristics of bureaucracy cause it to ignore circumstances which point to different organizational schemes for communication, making it ineffective.

Organizational Politics Within the Decision Environment

Organizational politics support the preservation of truth and honesty to solve organizational problems and create ambiguity (Senge, 1990). A "political environment" is one in which "who" is more important than "what." Thus, political factors impact on decisions (Brightman, 1988). Political interests can produce misleading cues that may further bias the recognition of issues (Backoff and Nutt, 1992) and the identification of problems. People are unwilling to reveal their problems in order to maintain a superficial peace and preserve the status quo. Politics may cause important information to be withheld (Backoff and Nutt, 1992). One superior may twist true information while waiting for further information to defend his/her analysis. Fear of retaliation from superiors and power struggles often stifle diagnosis. Bachrach and Baratz (1970) criticize a political environment in which power may be exercised by confining the scope of decision-making to relatively "safe" issues.

Luke (1974) opposes the influence of politics on the quality of decision-making in the decision environment. He states that a satisfactory decision analysis should consider both decision-making (a choice between alternatives of action) and non-decision-making (a
decision that results in the suppression or thwarting of a latent or manifest challenge to the values or interests of decision-makers).

Organizational politics within the decision environment cause neglect in both decision-making and non-decision-making. The exercise of power never emphasizes problem identification. And the "power hungry" never consider that people might thwart decision-makers with different values. Also, exercising power can indeed create its own paradoxes and double binds (Watzlawick, 1976). For example, power based on the threat of punishment attempts to influence members' perceptions and at the same time might teach members to withhold information in order to protect themselves.

Politics emphasize self-interest which is assumed to be the primary motive for decision-making behavior. Individuals rather than groups or organizations are assumed to be the major unit for decision-making. In the political climate of organizations, unilateral decisions by superiors who have more power may strongly discourage any meaningful participation and instead may yield pseudo-consensus by the constituents determining an issue (Zey, 1992).

When organizations are characterized as political, conflicts of self-interest and self-benefit make the organizational problem-solving process devoid of true communication. When the climate of false or partial communication becomes an unconscious habit, organizational anarchy completely destroys administrative operations (Wayson, 1993).

Organizational Culture as Environment of Decisions

Organizational culture has a crucial influence on decision-
making (Owens, 1984 & Brightman, 1988). Organizational culture is divided into three levels: assumptions, values, and physical artifacts (Schein, 1985). Positioned on the first level of Schein’s model are the visible behaviors or “artifacts” that are seen everyday or everywhere. The second level offers values and beliefs as the guiding principles for an organization. The third level contains the basic assumptions—assumptions which comprise unconscious “views of the world” for solving an organization’s problems. A strong organizational culture is constructed from shared basic assumptions which provide organizational members with the foundation for beliefs and values. The organizational culture provides them with the understandings that helps them to make sense of organizational events and acts (Morgan, 1986; Schein, 1985).

Consensus within the organization establishes clear values to influence people’s behavior with members agreeing on specific norms. The values become common denominators for all employees and provide guidelines that help employees identify, embrace, and act on the goals of the organization (Deal & Kennedy, 1982).

Cultural differences among organizations are derived from different basic assumptions and beliefs, not from superficial differences in administrative structure (Schein, 1985). When the organizational cultural values of participation and flexibility are carried over to the climate of group discussion, group members are willing to try different types of thinking in problem-solving. McGregor (1960) sees administrators as having one of two basic assumptions, Theory X and Theory Y. The culture of Theory X emphasizes external control
and direction and the culture of Theory Y encourages self-control and integration. When the culture of Theory Y is carried over to group decision-making, information sharing and consensus are more likely. Like theory Y, the "gardening philosophy" is advocated by Czarniawska-Joerges (1988) for organizational management and creates a strong motivation for individuals to participate in decision-making, because it emphasizes (1) decentralized decision-making; (2) the leadership of shared aspirations, (3) cooperation, (4) creativity and (5) responsiveness to environment.

**Organizational Culture For Learning As Environment of Group Decision-Making**

When a culture supports learning, such as adaptive learning and generative learning, organizations can produce or enhance change to improve organizational survival (Senge, 1991). When a culture supports learning, it provides a healthy environment for solving organizational problems. This healthy environment causes members to view an organization as a living organism that "faces its environment as the burglar faces a lock; he must find a way to get past the lock in order to get at the loot" (Watzalawick, 1984). Thus, organizational cultures which support learning usually position the organization as an infinite "formal openness" (Jantsch, 1976). The organization never stops exchanging information with its environment or with itself. It comprehends an unpredictable environment and the development of individual imagination, viewing events as incentives that change the whole organization.
A learning organization has a culture labeled as superconscious (Jantsch, 1976). It is viewed as an evolutionary and conscious organism. Organizations that support an evolutionary and conscious environment exhibit learning characteristics. When serving to diagnose organizational problems, evolutionary statements for organizational development have an immediate practical reference. Evolution is itself a progressive process. Thus, an evolutionary process promotes organizational learning. Its purpose makes an organization adapt to environmental change.

Batson (1972) believes organizations are a living organism that can create something truly new simply by a random event. Randomness appears to be the rule and order an improbable exception. This in itself is a thoughtful contradiction, warning organizations from the outset that new structures may follow (Watzlawick, 1976, p.56). According to Popper's theory of evolutionary epistemology (1987), conjecture and refutation become the function of knowledge growth. In fact, organizational randomness personifies a member's trial and error behavior which is identical to conjecture and refutation. A culture to support learning always views an organization as indeterminant, not susceptible to "prediction from without" because the open-ended evolution of knowledge makes the operation progress through members' continuous conjecture and refutation.

Learning organizations also are identified as a conscious organism. When a culture encourages learning, assumptions and values can change as the result of the learning process. The learning process results in an accelerated diversification of behavior in developing a
variety of personal aspirations (Habermas, 1976). When the conscious, as a medium, integrates individuals and organizations, it helps people understand the inner logic of a series of systematic changes or expansions (Habermas, 1979). The learning culture provides an organization with continuous self-transcendence when facing internal dynamics and external change. Like the theory of “dissipative structure”, a continually surfacing assumption explains the phenomenon of irreversibility of the macro-environment which is termed “thermodynamics” by Prigogine and Stenger (1984). The thermodynamics seek to build up new structures, not just move toward a state of equilibrium. It is characterized as being beyond all cultural bias, because it opens people’s knowledge of metadynamics—the reason why a learning culture embraces creativity.

A learning culture views an organization as a living system. It tries to understand the organization as a living being or as a whole. According to Einstein’s theory of relativity, all organizational phenomena are relative. Therefore, changing organizational parts does not improve the organization because some parts create improvement, while others must compensate for the change. Bohm (1980) also argues that unless people understand the wholeness of an organization, an organizational analysis is incomplete. When a learning culture recognizes the idea of “wholeness”, it protects against the notion of learning organizations as passive structures. Instead, ongoing reflection and analysis is viewed as innovative. Therefore, in order to produce true change, an organization must analyze the whole system. Only a change in the whole system can initiate real change in
the organization. Wilber (1985, p. 152) said...

the whole nature of social change becomes transformed. The images, perceptions, and alternative realities (images) that we can learn to "see," reprogram us.... Leadership for change becomes a community-wide social and individual learning, healing and holy task, for in it is the responsibility of reawakening in "us" all the ultimate potential of the seeds which "we" are.

A learning organization is continually self-producing and is defined as a kind of "autopoietic organization" (Maturana & Varela, 1992). Learning for developing organizations is achieved through three processes. They are ontogenetic transformation, metaontogenetic transformation and phylogenetic transformation. Every individual or department can develop self-aspiration or generate organizational reality for themselves called ontogenetic transformation. The achievement of co-ontogenetic transformation requires the interaction between different individuals or departments. Finally, the system is brought together into a totality with its interactive process moving and becoming a co-evolutionary development (Wilber, 1979). A change in the individuals helps to develop the whole system and a change in the whole system helps to develop the individuals. The relationship between individuals and the organization is cooperative. It avoids the dysfunction of double-bind logic in solving organizational problems, i.e. developing the individuals restricts the organization's aspirations; developing the organization binds the individuals' aspirations.

Organizations, as learning paradigms, operate in a process where organizational members can extend their abilities continually through
problem-solving and transformation. Kolb (1983) says that learning is a good tool for organizational transformation and problem-solving. In addition, a culture that supports learning eliminates people who refuse to see things “heating up” (Tichy, 1983). Organizations can fail to act until it is too late.

Organizational learning is initiated by individuals. Effective learning occurs when individuals can reflect on the consequences of their actions, thereby gaining insight. This is a process to energize an organization toward a desirable structure that harmonizes individuals’ aspirations. Effective reflection can add to an individual’s knowledge base and can result in a better understanding of the relationship between action and outcomes (Nadler, 1992) and between action and purpose. This is a conscious level of learning (Jantsch, 1976).

An individual’s desire for learning is not enough, if reciprocal recognition is lacking. Without reciprocity there is a threat to interpersonal trust. Effective interpersonal inquiry is very difficult because those who engage in reflection lack the information provided by others which is needed to interpret the consequences of their actions.

A culture that supports learning recognizes the value of productive failure and the shortcomings of unproductive success (Perkins and Nadler, 1992). Individuals can attain insights from the failure. Or individuals cannot understand a success without realizing potential threats. The emphasis on conscious analysis for an organization prevents the organization’s possible disruption in the long term. Mitroff and Linestone (1993) stress the importance of
"conscious acknowledgement" for improving an organization.

Concepts in an organization that supports learning are designed to serve the dual functions of (1) describing and understanding organizational reality, and (2) enabling individuals to take actions (Argyris, 1985). According to these learning characteristics, a culture can be developed through five practical disciplines: systemic thinking, personal mastery, mental model, shared vision, and team learning (Senge, 1990). Organizational learning occurs, when people utilize the five disciplines at the same time, because it can avoid homogeneous congruence or "groupthink". By applying the learning disciplines, people are encouraged to find true current reality which adapts to environmental change and active renewal.

A. Systemic Thinking

Mitroff and Linstone (1993) believe unbounded systemic thinking is effective thinking which develops an organization. Systemic thinking sees the world as an interconnected whole. According to Mitroff and Linstone, all things are interconnected.

When people attempt to diagnose or improve organizational problems, they have to deliberate on the whole system by synthesizing multiple perspectives. For example, when strong winds and black clouds are seen, people can predict that rain is coming. Wind, clouds and rain become interconnected and it is this interrelationship people used to judge whether or not they will go outside.

Bohm's (1980) theory attempts to explain what is needed by introducing two concepts. Organization analysis should focus on
explanations of the “implicate-wholeness” of emerging enfolding thinking patterns and the “explicate-order” of unfolding meaning that view the world as an undivided whole. Implicate wholeness analyzes an organization beyond the visible reality. Implicate wholeness is understood through an imagined wholeness. The unfolding meaning of visible reality which is used to analyze an organization can be interpreted in different ways because different understandings of the implicate-wholeness are developed. Then new structures within an organization are created based on understanding the emerging enfolding implicate wholeness to develop the meaning of unfolding explicate-order. Organizational development ultimately is derived from the development of the unfolding meaning. And without meaning there is no consciousness and the greater the development, the greater the consciousness (Bohm, 1987, P.102). Thus systemic thinking becomes conscious.

The finite form of the unfolding explicate order is somewhat ambiguous, because it depends on context (Bohm, 1987). Because organizational explicate-order is ambiguous, there is no final meaning, and so, a continual movement of creativity is produced. With the evolution of new organizational life, new activities (artifacts in Schein’s model) may have evolved in the creative unfolding of further meanings. This learning process is called “holomovement.” Organizational analysis should not only analyze visible reality, but also pay attention to latent influences. Otherwise, the sedimentary meaning of the explicate order would hinder creativity.

People living in organizations are typically trapped in their
perceptions of parts, and their views about the explicate wholeness are continually being reified, especially if they do not analyze the implicate order. In order to clarify the implicate order, persons must analyze the relationships and unavoidable contradictions and paradoxes among parts of the organization.

In Bohm's theory, enfolding implicate-order and unfolding explicate-order, organizational analysis not only concentrates on symptomatic problems, but also attempts to solve fundamental problems in the long run. All of the theories are concerned with a mind-shift from seeing parts to seeing wholeness and can be consciously analyzed if visible or not. Systemic thinking can prevent organizational self-disruption. When part-whole relationships are flawed, organizational systems can be based on flawless micro-logic that makes the macro phenomenon nonsense (Peters and Waterman, 1982). Systemic thinking drives organizations into the "age of interdependence", termed "Organizational Architecture", that sees an organization as holistic (Nadler, 1992) and makes organizational analysis effective.

Systemic thinking is a way of seeing the "structures" and thinking as complex as the transitions of different parts while looking for a wholeness as a new function that enables organizations to work toward higher goals. Systemic thinking supports organizational analysis through a multidimensional representation of consciousness and universal possibility (Wilber, 1990). By seeing wholes and viewing two sides of the problems, the organization learns how to foster health and nurture employees to prevent possible disruption (Bennis, 1976).
The comparison of choices energizes the organization to its advantage by delaying immediate choices and encouraging different thinking patterns.

Systemic thinking offers a language that reconstructs how an organization see people as active participants in shaping their reality, by seeing the present to create the future (Senge, 1990). In order to support learning, organizational culture must encourage trial-and-error activity. Such activity enhances imaginative thinking. Systemic thinking for organizational analysis reconstructs the complexity into a new structure; organizations can continually be remolded for future survival (Senge, 1990). These functions construct the rhythm of development. Systemic thinking energizes organizational learning, and organizational activities are rhythmically organized and dynamically synchronized in order to successfully achieve a universal good (Purser & Pasmore, 1992).

Gareth Morgan (1986) in the *Images of Organizations* emphasizes multiple perspectives on organizational management through descriptive metaphors. The production of multiple views of a problem is an explicit requirement for inquiry and for knowledge itself (Mitroff and Linstone, 1993, p.65). For example, current organization analysis usually overemphasizes the function of technology and expertise, but ignores individual and organizational or environmental perspectives. Thus an organization should encourage multilateral thinking to solve problems (Bennis, 1976). Systemic thinking attempts to integrate different perspectives to reach a comprehensive wholeness. Multi-perspectives and multilateral thinking attempt to produce the
transition from position-centered thinking based on a mechanistic view to possibility-centered thinking that explores any possibility of organizational creativity and innovation (Purser & Pasmore, 1992, p. 62).

Any single perspective of problem-solving has its limitations. A single perspective always produces a kind of one-sided insight. In organizational analysis, it tends to force others into a background role (Morgan, 1986) that is unethical. Quinn (1988) argues that some types of issues can be overlooked if the organization supports particular values. Thus, systemic thinking always attempts to overcome unethical ignorances. Habermas (1987) strongly argues that learning abilities first are acquired by an organization and need to integrate marginal groups or individuals into the organization's interpretative system. Only where multiple values are acknowledged will organizations be understood to be whole in a general sense; members can be open and flexible, suspending immediate judgments whenever possible, until a more comprehensive view of the situation emerges for organizational effectiveness. According to Jung, synchronicity refers to linking two perspectives or events together in a new meaningful way. Birnbaum (1988) strongly advocates that organizational members should be able to understand their organization through multi-framed perspectives and to synthesize new thinking in problem-solving. This will, in turn, increase the learning abilities of all employees and help their groups make decisions.
B. Personal Mastery

Organizations learn only when individuals can learn. However individual learning does not necessarily guarantee organizational learning if individual learning ignores an organizational mission. When organizations reward individual ideas or visions, the culture is carried over to group decision-making and individuals make efforts to provide some creative ideas. The emphasis on self-development increases humanized interaction among employees, which can stimulate more organizational development. The process of self-development can provide members with an extra source of motivation--a calling (Bryson, 1988)--that makes persons more involved in the organization's activities.

When the discipline of personal mastery becomes an organizational value, two basic issues ought to be emphasized; otherwise, the overemphasis on self-development might not be useful for a group. First, people need to continuously clarify what is and is not important for a problem. Senge (1990) argues that individuals often spend too much time coping with issues that are usually irrelevant to problems, and they tend to ignore why the problems are created. Second, in order to clarify problem characteristics, organizational purpose is viewed as a medium for personal development employed to reveal what is important and what is not important. Like Selznick's (1957) institutional leadership, eliciting individual motivation to accomplish an organizational mission is crucial to preventing self-development from turning into self-destruction.

Therefore, understanding the function of self-development within
the organization's purpose enables people to see current reality clearly and then the importance of the problems can be revealed. Personal mastery eliminates people who are entangled in counterproductive relationships. Otherwise they might pretend that every personal vision is ideal, and most people think that their ideas are the best ones. Like the effect of "Pygmalion", self-development becomes a hidden bias of a self-fulfilled prophecy (Merton, 1957). Organizational purpose, and self and others' feedback with emphasis on self-development are crucial for effective learning (Napier & Gershenfeld, 1993).

The juxtaposition of individual vision (individual ideal or imagination) and organizational vision makes individuals' ideas effective for their organization (Locke, 1991). The process helps find the gap between what the organization (current reality) is and what the people want. The discipline produces a healthy force for innovation, called "creative tension" (Senge, 1990). This creative tension is the catalyst that brings individuals and a system together, seeking a creative solution for the tensions. The energy of problem-solving, (based on self-development), ought to reduce the gap between organizational reality and personal ideas, but not with personal vision itself. Learning in this context does not mean unlimited self-expansion, but rather expanding the ability to produce the results people truly want to work with in an organization. Vision is not only a good idea for creative problem-solving but it also can provide members with an anticipated milieu that will work in the future.

In practiced administrative work, a willingness to learn from others and a commitment to the truth make personal vision effective.
The commitment to truth avoids learning ambiguity and produces willingness to communicate. Also a willingness to learn from others helps individuals find their own shortcomings. Otherwise it is difficult to assess what they believe they have understood from others and personal ideas are not useful for communication. Usually a safe organizational climate encourages individuals who can commit to the truth and are willing to learn from others.

However, safety does not mean that members are protected in an existing system and that people will only follow that system. Safety has to be accompanied with a desire for progress or learning, or it can reinforce laziness. A safe climate with a desire for progress encourages motivation for self-development. Such an organizational climate will strengthen personal mastery in two ways (Senge, 1990). First, it will continually reinforce personal imagination which is truly valued in the organizational future. For example, an individual’s vision has been used by the organization, but the person still continues to try new ideas. In this case, organizational progress and self-development become infinite. Second, organizations can provide an opportunity to help individuals develop their potential. For example, in-service training can help teachers continually gain new knowledge associated with changes in the society.

C. Mental Model

A mental model is a schema that is used as a basis for explaining organizational phenomena. The major purpose of the "mental model" is to help individuals make sense of their action. The discipline
attempts to expand members' mental abilities to attain competent consciousness in communication (O'Connor & Seymour, 1990). The mind is no longer an unchangeable schema explaining an external world. On the other hand, the mind is viewed as a part of the mental model's own on-going process for communicating with others (Dewey, 1929). Mental abilities are developed in order to make sense of their behavior by continually re-examining norms or espoused beliefs.

The development of mental models usually encourages learning (Argyris and Schon, 1978 & 1982). For example, in practical administrative experience people do not always behave congruently with what they say. The absence of internal commitment increases deception. The development of the mental model attempts to look for ways to close the gap between what people say and their actions by reexamining espoused values both individual or organizational. This thinking is called "deutero learning": "learning how to learn" (Bateson, 1990; Argyris and Schon, 1978). Seeking congruence between the internal psychological state and external behavior promotes learning from the mental model discipline. The mental model promotes organizational learning, because organizational or individual values might change with an environmental or time change. However, people usually say something based on their new espoused values, while their behavior is unconsciously based on their previously espoused values.

Two members, with different mental models or cognitive maps, can observe the same event and describe it differently because they analyze it with different beliefs and values. Failure to understand the
development of mental models has undermined many efforts for mutual learning. Thus, each deeply entrenched mental model or bounded value can ignore a valuable insight which is produced from other kinds of mental models.

Usually, mental abilities can be developed through learning from others and through analyzing the relationship between espoused values and organizational goals. Thus, "openness" and "organizational interest" ought to be stressed in order to improve mental models (Senge, 1990). Openness encourages people to clarify the opaqueness of the mind by self awareness and others' questioning. Organizational interests are the developmental center of problem-solving techniques, encouraging rather than stifling change, and consequently fostering openness. As the development of mental abilities can be disciplined with organizational interests and openness, individual mental models can be transformed to discuss different world views which can make decisions more productive.

Reflection and inquiry are two useful skills for developing mental models (Argyris, 1985). Reflection defers members' thinking processes so that people can become more aware of how they form their mental models and why their mental models influence their actions. Reflective learning makes the individual's espoused values problematic. Dewey (1929, p.110) argues that "when thinking introduces any modification into an antecedent assumption, it falls into error; in fact, productive origination on the part of mind defines error."

When reflection is absent from learning, organizational reality is
naively defined without discursive consideration (Habermas, 1975). Foucault (1980) emphasized the importance of discursive interrogation for problem-solving because truth is always subjected to power. A "power balance" among members to promote discursive conversation is important to find "truth". Obviously, reflective learning is only achieved by discursive conversation. Therefore, inquiry can develop an individuals' mental abilities because it promotes discursive interrogation. Inquiry concerns face-to-face interaction between people to find useful information from mutual discourse. These two learning skills show people how to develop a capability to understand themselves and others, and finally to understand the common world within which they live (Simon, 1983).

Usually two kinds of reflection are applied to organizational learning. One is introspective reflection and another is retrospective reflection. Introspective reflection makes an individual see himself/herself more clearly. In Kolb’s learning model (1983), introspective reflection skills avoid “leaps of abstraction” within the learning process, because people’s minds are accustomed to generalizing to a previous model. The “leaps of abstraction” occur when people generalize about concrete data without the process of self-questioning. Little by little, individuals’ thinking has produced a learning disability, without their realizing it.

Retrospective reflection enables people to see organizational reality clearly by testing historical events. The absence of retrospective reflection produces inertia that cannot transform an organization at all because the future is always predicted “from within” the
organizational history. When organizational reality is viewed as axiomatic or reified, organizations lose the function of learning (March and Cybert, 1992; Bernstein, 1980) and transformation becomes impossible.

Reflective learning is not enough, because individuals cannot understand others and themselves if they do not communicate with the others. Thus, inquiry helps people comprehend themselves and others as well. However, not all inquiry is available for organizational learning. Sometimes face to face communication can break the spiral of reinforcing advocacy (Senge, 1990). Questioning each other may be revealed as digressive or purposeless.

The most productive learning usually occurs when members combine the skills of reflection and inquiry, a process termed "reciprocal inquiry" (Lindbolm, 1990). Everyone makes his or her thinking explicit and subject to public examination. This reciprocal inquiry creates an atmosphere of genuine invulnerability in an organization. People in reciprocal inquiry are not trying "to win the argument" but to find a good solution that promotes organizational learning. Therefore, instead of reflecting upon it within oneself, members reflect on a reality through dialogue so that social mediation for reaching consensus is possible (Bohm, 1987).

Learning eventually results in changes in action (realization of ideal), not just taking new information and forming new "ideas." Recognizing the gap between espoused theories (what people say) and theory-in-use (how people behave) is vital. In an effective learning organization, people's behavior must fit new organizational structures
(Schon, 1974). Otherwise, the relationship between organizations and individuals might be alienated, when a new organizational structure is created and people still follow the old norms. The organizational ideal also cannot be realized solely by individuals. Argyris and Schon (1978) proposed Model II, double-loop learning, which attempts to reach the congruence between the organizational structure and individual behavior. The internal commitment of an action toward new organizational needs increases internal satisfaction and, in turn, reinforces the function of learning.

D. Shared Vision

A shared vision is not only an idea or a concept but a common ideal and a unique image for an organizational future. It is a force in people's hearts, a force of impressive power that orients member's behavior (Kouzes and Posner, 1987). The unique image may be inspired by a future orientation, but it should attain support from more than one person (Senge, 1990). A shared vision is more powerful than any other force, because it requires acceptance of others' expectations to become a common aspiration.

A vision is truly shared when group members have a similar picture and are committed to each other (Senge, 1990). When people really share a vision, they are connected or bound together by a common aspiration (Burns, 1978). The shared vision can maintain an organization by collecting an individuals' abilities to deal with known problems (Nanus, 1992), thus producing more energies for achieving organizational goals.
Personal visions derive their energy in problem-solving from individuals who care deeply about these visions. Shared visions energize people for problem-solving because of their collective force and sense of anticipation. Organizational intent on building true shared visions continually encourages members to develop their personal visions, because the power relationship among people in a true shared vision is “power with”. “Power with” is manifest in groups where each member is seen as an equal by the other members of the group (Kreisberg, 1992). Because everybody has equal power, when a person has an idea, others can learn from her/him. The eventual result is that the whole group becomes a meta-learning group by learning from each other.

In fact, people seek to build shared visions in order to implement organizational plans. A shared vision implies that an organizational mission has been promised and group satisfaction allows completion of that promise. This process combines individual and organizational visions into a new hologram (Mackenzie, 1991). Likewise, when members can share a vision of an organization, each person sees an individual picture of the organization at its best; each shares responsibility for the whole, not just for one part (Senge, 1990, P.13).

The art of leadership to formulate shared visions which are built from personal visions is vital for organizational learning. Certain steps to help build shared visions include: (1) gather information, (2) process the information, (3) conceptualize the vision, and (4) evaluate the vision (Locke, 1991). When a culture that supports learning is carried over to a decision-making group, members try to illustrate
interdependence between visions, values and purposes. This process helps group members trust and support one another as a catalyst for reaching consensus.

However without systemic thinking, shared vision may not produce effective learning, because the shared vision may habitualizes the members' thinking. Systemic thinking keeps members vigilant and receptive so that they can consciously analyze possible changes in organizations. When systemic thinking is involved in the shared vision, collectively shared structures of consciousness and stocks of knowledge represent a cognitive potential (Habermas, 1987) that encourages learning.

E. Team Learning

A team as a unit has been most popular for the organizational development process (French, 1990). Almost all important decisions are made by teams either directly or through team members who can implement individual decisions (Anderson, 1988).

Within organizations, team learning has three critical dimensions (Senge, 1990). First, teams promote the ability to think insightfully about complex issues, which can enrich the information used in problem-solving. Teams enable many minds to become more intelligent than one mind. Second, a coordinated action has to be developed in teams. Outstanding teams in organizations need the members' mutual trust which improves coordination; and the purpose of coordination is to foster complementary actions among team members to make actions acceptable. Third, team members' roles may
impact on other teams. For example, administrative meetings are held by principals in schools, which influence the meetings of individual departments. Thus, intergroup learning is necessary for organizational learning. Usually, the role of "linkage-pin" encourages intergroup learning (Likert, 1961, 1963). Teams linked with other teams become catalysts for learning through the whole organization. Knowledge can be disseminated through the whole organization through intergroup learning.

When teams are involved in learning, dialogue and discussion make teams successful (Senge, 1990). In dialogue, a free and creative exploration of complex issues is widely extended. In other words, team members listen attentively to one another and suspend their own points of view to promote a climate where a true solution can be reached. The purpose of dialogue is to pursue mutual gains and growth not to get a temporary victory.

In dialogue, feedback is important for mutual development. The feedback process provides a team with more dynamic, creative, progressive, and desirable negative-entropy rather than closed equilibrium of entropy among team members (Von Bertalanffy, 1968). The dialogue goes beyond any one particular understanding. This process attempts to make correct judgments for the whole group. The optimal learning process sees group interaction as a problem-solving system that requires sensitivity and judgment in the feedback process, making the information useful. In dialogue people are no longer primarily in opposition, but rather they re-examine true information in order to analyze an organization.
In order to develop a team, dialogue with members can be achieved by three processes (Senge, 1990). First, all participants must critically examine their own positions. Each team member becomes the observer of his/her own thinking. An obstruction of team dialogue is members' narcissism. Everybody always thinks their own thinking or experience is the best or most correct one. In fact, a latent danger is that individuals are ignorant of what they do not know. Dialogue provides a way with others for the team to help individuals clarify their own thinking and eventually reach a common goal. The function of dialogue is to help make judgments for groups rather than individuals (Nisbett and Ross, 1980).

Second, all participants must regard one another as colleagues. Dialogue can occur only when a group of people see each other as colleagues, thus establishing mutual trust. People who interact with each other in groups tend to like each other (Homans, 1950, 1961), which increase dialogue between the members. The relationship of group members should not hold under certain conditions. For example, when an authority relationship is involved between team members, the interaction of group members becomes involuntary. Since status differentials engender thoughts and ideas derived from external forces, people who are more influential should try to reduce such a discrepancy (Allport, 1924). Thought and idea are participative. Ideas and thoughts ought to have active power to find a reality that can explain organizational phenomenon reasonably. Ideas cannot be generated behind an absolute force. The force is always produced through something new and useful. In other words, the ideas usually
cannot be something new if they have not evolved from spontaneous participation.

Third, in team learning a “process champion” is required to energize dialogue more frequently and creates high morale in members to learn from each other (Bryson, 1988). The teams cannot learn unless the facilitator of a dialogue champions the process. This person should believe in the process and see his/her role as facilitating more effective thinking or more discourse. The functions of the process champions is to increase dialogue, which helps members identify the process and outcomes. This encourages the members to be responsible for their actions.

A thoughtful team process needs complete discussions. This indicates that the team has reached its highest potential. The dialogue and discussion are potentially complementary (Senge, 1990). Discussions help a team to develop potential problem-solving by avoiding premature criticism. However, the collected information through discussions is not necessarily useful for a team. Dialogue seeks for the information to gain insights that makes the diagnosis useful. However, the lack of information still undermines the team’s potential, without complete discussions.

Organizational Learning Solves Practiced Problems

When the learning culture is applied to solve real cases, some negative effects of task attribute, reward system, organizational resource, and organizational structure can be avoided.
Task Attribute

Highly complex unstructured tasks require more knowledge and flexibility while routine tasks do not (Morse and Losch, 1970). When people attempt to complete highly complex unstructured tasks, equivocal solutions promote the doubt whether the decision is feasible or not. Consensus can be difficult to reach. On the other hand, when people are involved in routine tasks, habitual thinking might threaten innovative problem-solving.

A culture that supports learning provides job training, which could increase the employee's knowledge toward the task. The job training usually has some functions. First, members need to know the importance of the task, though it is complicated and unstructured. Second, members should be encouraged to search for relevant information, and so that before making a decision members would decrease the anxiety that is caused by the lack of knowledge. Third, people should evaluate the collected information. This process decreases the contamination of useless information. Fourth, when the group members go back to a formal meeting, a mutual “trial” is utilized to demonstrate the new idea through interrogation of each other's collected data and synthesized into a common agreement for problem-solving. Clarification is a necessary process for highly complicated tasks and may increase the credibility of decision consequences.

On the other hand, highly routine tasks may also threaten organizational development if the routine tasks cannot be analyzed
carefully. When members perform routine tasks, a problem-solving process is considered as superfluous. Complaints about the superfluousness of the process generate an uncomfortable atmosphere which damages the collective willingness to finish the task. Also routine tasks might provide members with familiar information which traps members into quick judgments. A learning culture never sees routine tasks as simple but attempts to extend the members' creativity. Therefore, if the task is routine, members still are willing to try new ways of thinking to reach better solutions than normal approaches to problem-solving. When a better solution is reached, the problem-solving quality is identified.

**Organizational Resource and Reward System**

Decision-making is a tool of organizational change. However, a change is usually initiated with the redistribution of resources, power or rewards. The resources need to carry out a decision and the redistribution of the resources influence stakeholders who can determine the feasibility of the decision (Backoff, 1992). Because the stakeholders do not support the decision, the decision is difficult to make and thus, the decision quality may be bad. Also when organizational resources are scarce, different stakeholders might compete with each other for resources or power. Before discussing a decision, the climate of competition or hostility has already undermined interpersonal relationships and can lead to an alienated relationship between the members.

Reward systems are also intended to influence a variety of
decision behaviors (Galbraith, 1977). The development of reward systems motivate knowledgeable workers to interact with their counterparts, to learn more about each other's work, and to be more innovative (Purse & Pasmore, 1991). For example, if it is difficult to anticipate achieving a decision in the future, group members may not like to express themselves too much.

A culture that suggests learning extends organizational abilities to actively create resources and reward systems. The new resources and rewards prepares the organization for new ways of thinking. An organizational culture that supports learning usually creates an advantageous condition (reward and resource system) which precedes organizational innovation. Consequently, it provides at least four process to enhance the ability to solve problems. First, if the organization creates new resources to prepare for the change, it decreases members' anxiety or fear of losing power or benefits. For example, the Taiwanese government wants to institute a certification system for promoting teachers' quality and avoid the normal college controls of the whole educational system. Before planning how to change the system, the government should develop a number of new schools as the test markets. Otherwise, the normal system's resistance might make an innovative policy fail, because some students would find it difficult to look for a job after graduating from normal colleges. Second, organizational purpose should be emphasized. Organizational loyalty can make individuals give up personal benefits over the short term, and focus on the long-term well-being of the organization. Simon (1955) stresses the importance of organizational loyalty for
organizational change. Extra energies also can be created by loyalty. Third, mutual negotiation is necessary. Using continuous dialogue, people can weaken the paradox of competing for the resources and then find a new synthesis to examine different perspectives. Fourth, if persons are involved in an organization with less extrinsic rewards, an intrinsically rewarding atmosphere can serve as an attraction (Pfeffer, 1981). In fact, personal mastery is a discipline that could augment intrinsic rewards to enable people to solve problems.

Organizational Structure

When organizational structure has been established by elites, either officials or authority, decision behavior might not be as effective for group decision-making. For example, the organization rules show that if the decision is beyond certain conditions, the organization will not accept that decision. Members who have less flexible options for a particular situation could be influenced by external regulation. If members violate the regulation to formulate a solution, the policy may be viewed as illegitimate. The regulation usually is reflective of an organizational structure that precedes the members' decision behavior that influences true consensus and decision-making quality. Because the relationship between decision-makers and structure is unchangeable, decisions are only the reproduction of the structure. Habermas (1973, p.60) “conceives “structure” as a set of sedimented selection rules that prejudice what is recognized as a matter requiring regulation.” An organizational culture of systemic thinking that support learning views structure as justifiable and dissolves the
legitimacy of authority..

Organizations also may set up some parameters for group members. For example, a proportion of the budget may have been decided on by the principal at the beginning of every semester, but the principal still discusses the distribution of the budget with all the teachers. This process creates a "superficial phenomenon of democracy" designed to eliminate resistance from organizational members called "pseudoparticipation". In fact, the scope of decision-making has been confined. A more effective practice is collective autonomous participation" or "collective conscious" (Habermas, 1987), in which members delegate an authority to make the decision, thus eliminating any sense of being "used" or manipulated. The lack of shared vision, personal mastery and team learning has hindered organizational learning and diminished problem-solving abilities.

B: External Environment

Uncertainty and Ambiguity:

All decision makers are constantly receiving information from the environment (Ebert & Mitchell, 1975). The environmental complexity and instability usually produce uncertainty for problem analysis (Duncan, 1972; Smart & Vertinsky, 1984). Organizational technology in particular can not effectively detect the environmental uncertainty or ambiguity. As the environment becomes more uncertain, organizational members needs more of a thoughtful learning process to extend their abilities. Otherwise, misdiagnosis might make
problem-solving ineffective. Systemic thinking and team learning slow down to explore deep causes of problems necessary so that correct action can be taken and symptomatic events can be diagnosed quickly (Moreland & Levine, 1992).

In an uncertain environment, the lack of technical abilities and knowledge causes members to fear making a decision. In order to construct an advantageous organizational atmosphere for problem-solving, members develop different decision-making processes. This developmental process is implied by the contingency theory which accounts for the lack of technologies and the ambiguity or uncertainty about information. According to the reality based on the characteristics of technology and external environment, the group members have diagnosed what kinds of decision making process should be used.

Daft's (1989) contingency theory of decision making presents two dimensions, environmental uncertainty and technical knowledge, and four frameworks to explain the complex environment that can be used for problem-solving.

In Daft's theory, the first framework prevails when high technical knowledge exists in low environmental uncertainty. In that framework, the rational approach is usually preferred, because the information of cause-effect relationships can be collected or developed by group members. Familiar expertise often is used to deal with this kind of problem.

The second framework prevails when the organization has high technical knowledge and there is high environmental uncertainty. In
this framework, bargaining or forming coalition through shared solutions is often used. To reach agreement is considered very important, because the group members have a high ability to implement their decision, even though the environmental uncertainty is high.

The third framework is considered appropriate when technical knowledge about the problem is low and the environmental uncertainty is relatively low. In this framework, trial and error may be used for problem-solving. Mutual efforts are an accepted approach to overcome the lack of prove technology.

The final framework suggests that technical knowledge is low and the environmental uncertainty is high. In this framework it is very difficult for members to identify problems. Creative thinking and negotiation are appreciated, because in this situation, it is innovation that overcomes environmental uncertainty and the deficit of technology to create unanticipated results that earn people's approval for a decision.

Although the contingency theory can explain the phenomenon of environmental uncertainty, the assumptions guiding each framework are not transferable with a change in time or shifting context. However, for people's active development on organizational structure, higher aspirations may produce chaos in organizations, no matter which framework is identified. A learning culture attempts to find a new order in organizations in spite of chaos. Prigogine (1984) says a new order could develop out of chaos that is developmental.

A consistent assumption in each framework is challenged by
organizational learning, organizations always are put in passive positions related to their environments. In fact, a complex environment may produce paradigm shift back and forth at any time. Or complex environment is continually dynamic with a change in time that will not revert to the previous state. Therefore, learning cultures anticipate the assumption of each framework with a change in time, but sees irreversibility of environmental change. It provides members with the energy to examine possible assumptions continually and avoid using the framework classification. A culture that values learning fits the assumptions of the irreversibility of environmental change. In learning cultures, organizational abilities are extended personal potential encouraged, decreased routine defensiveness, pursued common aspirations, interrelationships between organizational parts sought and provided "possibility orientation" is in order to predict the dynamics of the environment. Different assumptions revealed in the same framework become possible and promote members' willingness to deliberate a wide range of values for organizational renewal.

**Summary**

In summarizing the research examined thus far, many theories have been offered on decision-making looking for consensus and the quality of the decision-making. Experts have advocated and focused their attention on organizational development through thoughtful decision-making processes. Others have focused on group members, through their values, and their contributions. Factors that influence
consensus and the quality of decision-making include individual factors, group factors and factors of decision-making environments. Each has an impact on a group’s problem-solving ability and indirectly affects every organization (and every school) in some way. Individual openness, rational argumentation, and a learning culture are able to energize a group’s ability for reaching consensus and promoting the quality of decision-making.

Most researchers concur that group decision-making, which is looked up to and appreciated above all other types of decision-making, is a problem-solving process that “makes collective efforts and successful decision outcomes happen” within an organization. No single control factors can ensure the success or failure of group decision-making. Therefore, a thoughtful group decision-making process needs to consider all the factors, because all the factors interact with each other. Individual openness, rational argumentation and learning culture, based on the ability of group members to integrate all the influential factors’ influence may be the keys. The focus of this research effort was on driving a group’s energy to reach consensus and enhance the quality of their decision-making.
Chapter III
Methodology

This chapter provides a description of the research procedures used to investigate the perceptions of each decision-making group, composed of several teachers and administrators in school settings who make real decisions for their schools. The procedures used are organized under five main headings: 1) Design of the Study; 2) Sample; 3) Instrumentation; 4) Procedures for Data Collection; and 5) Procedures for Data Analysis.

Design of the Study

This study was a relational and correlational research design. The purpose was to explore the relationship between three independent variables and two dependent variables.

Some decision-making teams were identified and selected for this study. The intent of the study was to predict and explain the relationship between individual openness, rational argumentation, learning culture and the quality of decision-making and consensus. Natural decision-making teams that included teachers and administrators making real decisions in their schools were encouraged to complete the five instruments for the research. A
general problem-solving process was explored. Teams were available for the study when they were scheduled to have regular meetings.

In order to control the confounding variables, the similarity of different group characteristics had to be found. There were problem characteristics, the technique of decision-making, group size, schools, and the relationship of authority among the group members.

Three of the five instruments were developed to measure three independent variables, which were individual openness, the flow of rational argumentation and the environment of the decision-learning culture. The others were developed to measure the two dependent variables, which included consensus and the decision-making quality. In addition, the study analyzed the interrelationships among the five variables. Also the study analyzed how each independent variable or the linear combination of the independent variables are related to each dependent variable. Finally, the study analyzed the relationship between the linear combination of the three independent variables and the linear combination of the two dependent variables. The study then provided further analysis by distinguishing whether the different independent variables contribute to the linear combinations of the two dependent variables differently. Finally, this study then provided another analysis by distinguishing whether the different independent variables contribute to each dependent variable differently.

Sample

This was a purposeful sampling, and not a random sampling. The characteristics of the selected natural decision-making teams had
to fit the purpose of this study.

Natural decision-making groups that have regular meetings participated in the study. These groups solved general organizational problems and were selected to identify individual openness, rational argumentation, learning culture, and decision-making quality and consensus.

For this purpose, the sample needed to fit the research design. However, in order to control the extraneous variables, some characteristics among different groups had to be similar. In this study, the similarity of group size (3 to 5 persons), the problems of group discussion (such as general problem-solving for teaching development), school setting, and the technique of decision-making (such as face-to-face interaction-intervening variables), needed to be similar. Finally, the relationship of authority was used to explore how the power influence in teams could be wielded. The control of these variables avoided threatening the internal validity of the study.

In order to generate the information necessary for this study, 60 natural decision-making groups from school settings that have regular meetings were contacted and asked to participate. These subjects were attained from elementary schools and secondary schools.

No members in the group could drop out or substitute for other members, since the exact same team had to be available. So the regular meeting would have the same history. When a new teacher or administrator gets involved in the team, the history of the team may be changed.
In order to get the sample and explore the teams to see whether or not they fit the purpose of the research design, some specific processes were involved. First, contacting such a large number of decision-making groups required the researcher to contact each group by phone or letter to encourage them to participate in discussion. Then the researcher provided the five instruments to collect the required information, once the groups met.

Data, from the subjects who declined to participate, or dropped out, did not participate in the entire study, or involved new persons, was deleted from the group's subjects because all the groups had to be evaluated under the same conditions. When any one of the team members did not respond to the instruments completely, did not mail them to the researcher, or did not respond to the questionnaire carefully, the questionnaire was not used if it was influential enough to threaten a true estimation of the group's characteristics. This was determined by the researcher's judgments. When the collected data were not available to explain a total group, the data was given up. Finally, those with incomplete questionnaires, or those who gave no differentiated responses (rating each answer the same) were removed from the study. A total of 25 groups comprised the sample used.

**Individual Openness, Policy Argumentation, Learning Culture, Consensus, Decision-Making Quality: Focus for Analysis**

The perceptions of group members (teachers and administrators) were assessed through the use of five instruments to measure individual openness, rational argumentation, learning culture,
consensus, and decision-making quality. The analysis of these five instruments is defined by the researcher. The instrument of individual openness was used to assess whether individuals opened their minds to communicate with others or not. The analysis of rational argumentation assessed the extent to which group discussion was rational. The analysis of learning culture focused on whether the organizational culture, as the environment of decision-making, was identified as having the characteristics of learning or not. The analysis of consensus focused on whether group members' cognition, affection, and attitude were congruent with those on their team. Finally, the analysis of decision-making quality focused on whether or not group members made the right decisions.

**Instrument**

The five instruments for the questionnaire were developed by the researcher for this study. The five instruments measured individual openness, rational argumentation, learning culture, the quality of decision-making, and consensus.

**A: Pilot Study**

Reliability was established by a pilot study with 3 groups, two school boards in the Columbus, Ohio area and a Ph.D cohort group in the Department of Educational Policy and Leadership at the Ohio State University. This pilot study explored the group decision-making processes for solving general schools' problems. Twenty-three questionnaires were sent out to do the pilot study and fifteen questionnaires were returned for evaluation. When the data from the
questionnaires were collected from the two school boards and Ph.D cohort, the responses to 14 of them were used to establish the reliability of the five instruments. The SPSS program was used to analyze the data and establish the reliability. The five instruments' reliability coefficients (Cronbach Alpha) were .809, .87, .94, .89 and .807 for the instruments of individual openness, rational argumentation, learning culture, decision-making quality and consensus, respectively. After the actual data sample was collected, the data of ninety-four persons were used to establish the reliability. The five instruments' reliability coefficients (Cronbach Alpha) were .801, .94, .95, .95, and .90 for the instruments of individual openness, rational argumentation, learning culture, decision quality and consensus, respectively. Also in order to examine the discrepancy of the five instruments, inter-item correlations and the analysis of conversion and diversion among the five instruments were established. Content validity was established by at least 3 experts who have relative professional areas in organizational development and decision analysis.

Also, after doing the pilot study, the cross-item correlation showed that the items on individual openness were lowly related to the items on both learning culture and rational argumentation. Thus, individual openness was used to test the hypotheses effectively. Though the tautological relationships among the items between rational argumentation and learning culture appeared early in this study, analysis of data in the small sample from the pilot study gave no reason to make major modifications. So, data were collected using the instruments as they were.
However, the possibility that they still could introduce bias into the analysis led to intensive examination after all data were collected. In the larger sample, the possible weakness were magnified enough to cause modifications discussed in Chapter 4.

B: Measurement of Instruments

Scores were generated for each group on the measurement of variables by the following five instruments:

**Individual Openness** This instrument was used to measure whether individuals show a willingness to challenge others' thinking or not; and whether individuals generally are willing to question their own thinking. The instrument has a total of fourteen items. See Appendix C.

**Rational Argumentation** (Mitroff and Mason, 1983, Toulmin, 1958) The instrument was used to measure whether or not group members' communication for clarifying different assumptions on controversial issues is developed through the support of reason, logic, facts, and justification. The instrument has a total of twelve items. See Appendix C.

**Learning Culture** (Senge, 1990) The instrument was used to measure whether organizational characteristics encouraged people to develop their continuous abilities to solve organizational problems through five learning disciplines. The characteristics of organizational learning was divided into five categories. They are the systemic thinking discipline, the personal mastery discipline, the shared vision discipline, the
mental model discipline, and the team learning discipline. See Appendix C.

A: Systems Thinking Discipline: Organizational culture for solving problems considered the whole system and the interdependence of all the components of the organization.

B: Personal Mastery Discipline: Organizational culture emphasized self aspirations and self development.

C: Shared Vision Discipline: Organizational culture emphasized collective aspirations and shared meanings for problem-solving.

D: Mental Model Discipline: Organizational culture emphasized organizational interest and if people presented information candidly, and viewed the tensions between organizational reality and the possible development as creative cues.

E: Team Learning Discipline: Organizational culture encouraged people to see to each other as colleagues and if innovation occurred through a collaborative team process.

After the data were collected, the factor of learning culture was dropped as the study progressed because learning culture was tautologically related with the measure of rational argumentation. More discussions was showed in chapter 4.
Decision-Making Quality: The instrument was used to measure how group members perceived the quality of decisions. Two items were used to get a score for quality. First, in general, how effective are the decisions your group makes? Second, overall, how satisfied are you with the decisions your group makes?

Consensus: The instrument was used to measure whether group members reach true agreement on their decisions. The instrument had nine items. See Appendix C.

Each instrument used a self-perceived choice format for each of the four categories. The Likert Scale was used to develop the descriptors of the instrument. Four descriptors were listed on each of fourteen, thirteen, fourteen, ten, and nine items, and respondents were asked to follow the instructions to rank the four descriptors. These ranks were from one to four and identified characteristics of "very little" to "very much"; the score "1" represents very little, while the score "4" represents very much. When the score of each item increases, the measured meaning of that item will promote increase. The total scores of each questionnaire for each person showed that a person's preference was toward measured variables. In other words, this is a self-report survey. Then the average scores of each group were used to look for relationships between the different variables. In order to detect whether respondents answered the questions very carefully, some questionnaires were designed with a few questions scored in the opposite direction. When the researcher
found that the respondent did not answer the questionnaire very carefully, that person's questionnaire would not be useful.

The instruments had a cover letter to instruct the respondents on how to complete the instruments. In the individual-group interaction section of the questionnaire, some questions were used to distinguish different teams and schools. This section helped the researcher to establish the group scores. In the instructions for each instrument, a section of instruction was used to clarify how to complete the five instruments. Finally in the last page of the questionnaire, the additional cue of the return address reminded the respondents to send their questionnaires back.

In order to help understand the details of the instruments, each item's standard deviations and means for ninety-four persons will be showed in Appendix F.

Modify the Term of Individual Openness

In order to look for the correlations among different factors, a group average score was used to construct a score for individual openness. Therefore, the constructed score described group openness, not individual openness. A more descriptive term “group climate of individual openness” will be used to conclude the results in chapter 4 and Chapter 5.

Limitations of Low Variability In Individual Openness

After the data were collected, limitations were posed by having small variability in the instrument of individual openness. The
standard deviation for the twenty-five groups was 2.96 and the range was between 39.0 and 48.7. Possible bias could be introduced into the analysis due to the utilization of self assessment which might result in overestimation of individual openness by the subjects. openness. This was a limitation of the self-reported study. In the future research, some external observers can be used to re-examine individual openness as a means of improving the study.

The Analyses of Validity: The Long and Short Measures of Decision Quality

The ten items for measuring decision-making quality include the measure of procedure quality (the first eight items) and the outcome of the decisions (the last two items). However, the items related to procedural quality might also measure individual openness and rational argumentation. Therefore, a new hypotheses was formulated: “the items used in the long measure of Decision Quality are tautologically related to the items used to measure independent variables”. The testing is analyzed in chapter IV and resulted in using only two items from the instrument.

The Analysis of Items in Individual Openness and Rational Argumentation Interacted

After the data were collected, the fourteenth item on the instrument of individual openness was highly correlated to the measure of rational argumentation (.61), yet this item only moderately
correlated to the measure of individual openness (.49). It appears that the fourteenth item should belong to the measure of rational argumentation more appropriately than the measure of individual openness. The fourteenth item on individual openness answered the question "In general, to what extent do other group members express their feelings about problems that are discussed in the group?" It seems as if this item assessed other members' feelings in the same way to rational argumentation assessed the group's characteristics. The fourteenth item on the measure of individual openness assessed other people's feelings - different from other items of this instrument which assessed the individual personal characteristics. However, when the item was moved to rational argumentation, the result was almost the same; therefore, the item was kept in the instrument of individual-group interaction.

Procedures for Data Collection

In the study, procedures were developed to collect data. First, all schools which were appropriate for the study were listed. These schools were located in New York, Connecticut, and Ohio. The information included schools, coordinators of teams, addresses, and telephone numbers. Then, a letter was sent to all listed schools to ask for the participation of the team members in the study. The letter also asked team coordinators to respond as to whether they were willing to participate in the study or not. When it was found that there were not enough teams' responses, more teams were solicited. A school might have more than one team. Some of the questionnaires were sent to
team coordinators for distribution; some were sent to each team member individually. Each questionnaire contained a self-addressed return envelope. Two weeks after the questionnaires had been sent out, an additional letter was sent to remind participants to complete the questionnaires.

Each teacher and administrator was asked to complete the five instruments about their general problem-solving process.

The instructions explained how to finish each. Members were asked to identify individual openness which they believed reflected on their own thinking. Overall responses to the characteristics of openness, provided in the instrument, resulted in scores on fourteen related questions. Respondents who assigned higher scores on the survey were considered to be one to be open to express himself or herself.

Every person was also asked to rate the extent of rational argumentation in the group. Using the scale of rational argumentation, the teachers and administrators were asked to identify the argumentative characteristics which they believed prevailed in their group's discussion. The average scores of each team for the rational argumentation instrument were the raw data for analyses. The higher the average scores the respondents of each group identified, the greater the characteristics of rational argumentation in group discussion was.

Everyone was asked to rate the characteristics of learning in their own school environment. Using the instrument for learning culture, the teachers and administrators in each group were asked to
identify the extent to which their organization encouraged learning. The average scores for each team for the learning culture instrument were the raw data for analyses. The higher the average scores the respondents of each group identified, the greater the learning characteristics of the organizational culture. This score was eliminated from the study as described better in chapter 4.

Using the instrument of consensus, the teachers and administrators in each group were asked to rate the extent of consensus. On the average among scores for each team on the instrument of consensus, the higher the scores that the respondents of each group identified, the more group consensus there was.

Finally, every one in each group was asked to identify the quality of decision-making. Ten important characteristics of the decision-making quality were developed to measure whether or not the decisions were good or bad. Using the instrument of decision quality, the teachers and administrators in each group were asked to identify decision-making quality. On the average, among scores for each team on the instrument of decision-making quality, the higher the scores of the better the indication of quality in decision-making quality.

Procedure for Data Analysis

After the information was provided by all the group members on individual openness, rational argumentation, learning culture, decision-making quality, and consensus, each group's average scores for each of the variables were used as raw data for the data analysis. In order to find the correlation between the five variables and the
correlation between all the independent variables and the dependent variables.

The independent variables included individual openness in the decision-making group, rational argumentation and learning culture. Dependent variables included decision-making quality and group consensus. All the scores reflected group members' perceptions.

Three statistical techniques were used to assess different kinds of relationships between different hypotheses while using the same data. Because group members were interdependent, the raw data were the average scores of each team for every variable. The SAS program was used as the tool to evaluate the data for the three statistical techniques.

Pearson correlation was used to get the correlation coefficients between the variables. The t-statistic determined whether the correlation coefficient of any two variables was significantly different at established probability levels and determined if there was any significant differences between any two variables.

Stepwise multiple regression mainly tested the relationship between multiple independent variables and one dependent variable. A stepwise multiple-regression model was used to explain and predict what proportion of decision-making quality and consensus was accounted for by individual openness and rational argumentation. Ordering was determined by the data. Independent variables were selected to enter the model by the data. When an independent variable was selected to enter the model of stepwise multiple regression, the independent variable which produced the largest "increase in R
square" in comparison to the remaining independent variables, or the F test was used to determine whether variance of the linear combination of individual openness, rational argumentation and organizational learning culture significantly contributed to decision-making quality or consensus. The F-test was used to find if the variance of each independent variable (individual openness, rational argumentation, organizational learning) unique significantly contributed to each dependent variable (consensus and the decision-making quality). Semi-partial correlation coefficients were used to explain the data.

The main purpose in using a canonical correlation model is to find the largest values of correlations between the linear combination of multiple independent variables and multiple dependent variables. This correlation coefficient is called the "canonical correlation coefficient." It also provides the information used to determine if different independent variables have a discrepancy of contribution to the linear combination of dependent variables. It is also used to determine which independent variable is ranked highest in contributing to the linear combination of dependent variables. On the other hand, this model was also used to explore the discrepancy of two dependent variables that were accounted for by the linear combination of independent variables. A canonical correlation model was used to explain and predict the correlation between the linear combinations of individual openness, rational argumentation, and learning culture, and the linear combination of decision-making quality and consensus or vice versa.
The F-statistic was used to test whether the linear combination of individual openness and rational argumentation have important correlations with the linear combination of consensus and decision-making quality.
This chapter reports the results of data analyses used to test the research hypotheses. The intent of this study was to find the relationship between group climate of individual openness (IO), rational argumentation (RA), and learning culture (LC), and decision-making quality (DMQ) and consensus (CO).

This chapter also provides further analyses of the instruments and shows how two were modified after data were analyzed.

The Analyses of Instruments

A: The Long Measure and the Short Measure of Decision Quality

After the data were collected, the original measure of decision quality appeared to be flawed. First, several observers felt that some items in the measure were similar to items on the independent measures. This raised a question whether any observed correlation between the independent variables and the dependent one would be spurious, reflecting merely that they were defined by the same operational measure.

The analysis of the cross-item correlations between all the measures showed low correlations between the decision
Table 1
Summary Table of Group Means for IO, RA
Sum of RA and LC, DMQ, and CO

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<th>Group</th>
<th>IO</th>
<th>RA</th>
<th>LC</th>
<th>DMQ</th>
<th>CO</th>
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<td>36.0</td>
<td>75.7</td>
<td>6.0</td>
<td>31.0</td>
</tr>
<tr>
<td>16</td>
<td>45.0</td>
<td>31.0</td>
<td>60.7</td>
<td>5.7</td>
<td>26.3</td>
</tr>
</tbody>
</table>
Mean Scores

<table>
<thead>
<tr>
<th>Group</th>
<th>IO</th>
<th>RA</th>
<th>LC</th>
<th>DMQ</th>
<th>CO</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>39.3</td>
<td>31.0</td>
<td>67.0</td>
<td>6.0</td>
<td>30.7</td>
</tr>
<tr>
<td>18</td>
<td>46.3</td>
<td>39.3</td>
<td>83.0</td>
<td>7.3</td>
<td>32.3</td>
</tr>
<tr>
<td>19</td>
<td>39.3</td>
<td>32.7</td>
<td>77.4</td>
<td>6.3</td>
<td>27.7</td>
</tr>
<tr>
<td>20</td>
<td>42.3</td>
<td>38.7</td>
<td>79.0</td>
<td>6.7</td>
<td>31.0</td>
</tr>
<tr>
<td>21</td>
<td>39.8</td>
<td>32.4</td>
<td>67.4</td>
<td>4.8</td>
<td>26.0</td>
</tr>
<tr>
<td>22</td>
<td>43.0</td>
<td>35.0</td>
<td>73.3</td>
<td>6.0</td>
<td>30.7</td>
</tr>
<tr>
<td>23</td>
<td>40.1</td>
<td>26.6</td>
<td>54.6</td>
<td>4.0</td>
<td>24.7</td>
</tr>
<tr>
<td>24</td>
<td>47.3</td>
<td>43.0</td>
<td>89.7</td>
<td>5.0</td>
<td>35.7</td>
</tr>
<tr>
<td>25</td>
<td>47.7</td>
<td>32.3</td>
<td>62.0</td>
<td>6.0</td>
<td>31.7</td>
</tr>
</tbody>
</table>
making measure and group climate of individual openness (0 to .2). But high correlation coefficients were found between the decision-making measure and the rational argumentation measure (.5 to .6) and between the decision-making measure and the learning culture measure (.4 to .7). In other words, high correlations between items on the decision-making measure and items on both the rational argumentation measure and learning culture measure indicate the possibility of a tautological relationship. Consequently, the instrument on decision quality was reduced to two items which were clear measures of perceived decision quality separate from process.

According to Table 2, almost the same correlation coefficients were found for the correlation of group climate of individual openness and decision quality using the long and the short measure of decision quality. On the other hand, different correlation coefficients were found between rational argumentation and decision quality using the long and the short measure of decision quality. These correlations also supported the suspicion that the longer measure was tautological related to rational argumentation. the analysis with further evidence.

Consequently, a new hypothesis was tested: "The items used in the long measure of decision quality are tautologically related to the measure for the two independent variables." It was tested by using a shorter measure of decision quality made up of two questions that clearly and directly asked how respondents perceived the quality of decisions made by their group.

According to Table 3, high correlations were found between the
items on decision quality and both the rational argumentation measure and the learning culture measure. Analysis of the data using both measures indicated that the null hypothesis must be rejected. The short measure (the last two items) seemed to be the more reliable one to use as a measure of decision quality.

Table 2
The Summary of Correlation between DMQ and IO and RA
For Long Measure and Short Measure of DMQ

<table>
<thead>
<tr>
<th>Var.</th>
<th>DMQ (Long)</th>
<th>DMQ (Short)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO</td>
<td>.42</td>
<td>.43</td>
</tr>
<tr>
<td>RA</td>
<td>.76</td>
<td>.59</td>
</tr>
</tbody>
</table>
Table 3

Summary of Correlations Between Items on Decision Quality and the Rational Argumentation Measure and the Learning Culture Measure

<table>
<thead>
<tr>
<th>Items Of DMQ</th>
<th>RA Measure</th>
<th>LC Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.78</td>
<td>.60</td>
</tr>
<tr>
<td>2</td>
<td>.74</td>
<td>.60</td>
</tr>
<tr>
<td>3</td>
<td>.69</td>
<td>.57</td>
</tr>
<tr>
<td>4</td>
<td>.61</td>
<td>.57</td>
</tr>
<tr>
<td>5</td>
<td>.65</td>
<td>.53</td>
</tr>
<tr>
<td>6</td>
<td>.68</td>
<td>.53</td>
</tr>
<tr>
<td>7</td>
<td>.68</td>
<td>.59</td>
</tr>
<tr>
<td>8</td>
<td>.65</td>
<td>.62</td>
</tr>
<tr>
<td>9</td>
<td>.72</td>
<td>.64</td>
</tr>
<tr>
<td>10</td>
<td>.61</td>
<td>.50</td>
</tr>
</tbody>
</table>
B: Analyses of Rational Argumentation and Learning Culture

After the data were collected, the original measures to separate rational argumentation and learning culture appeared to be flawed. First, several observers felt that some items in the rational argumentation were similar to items on learning culture. Also the correlation between rational argumentation and learning culture was .76. That raised a question whether any observed correlation between the rational argumentation measure and the learning culture measure would be spurious, reflecting merely that they were defined by the same operational measure.

The cross-item correlations among all the measures showed low correlations between the rational argumentation measure and the individual openness measure (0 to .2) and between the learning culture measure and the individual openness measure (0 to .2). But high correlations were found between the learning culture measure and the rational argumentation measure (.4 to .6). In other words, high correlations between items on the rational argumentation measure and items on the learning culture measure indicate the possibility of a tautological relationship.

Consequently, a new hypothesis was tested: “The items used in the rational argumentation measure are tautologically related to the learning culture measure”.

According to Table 4, high correlations were found between the items on rational argumentation and the learning culture measure. Analysis of the data using both measures indicates that the hypothesis
should be rejected. The decision was that rational argumentation and learning culture seemed to measure the same thing. Therefore, the two were merged into one to analyze the data. The new measure seemed to measure rational argumentation and that is the assumption that guided all analysis reported in this chapter. The original data will be analyzed more thoroughly in a future study and the measure for learning culture will be modified for more valid measurement.

Research Hypotheses

The intent of the study was to find the relationship between group climate of individual openness (IO), rational argumentation (RA), and learning culture (LC), and decision-making quality (DMQ) and consensus (CO).

After learning culture was eliminated from the study, the hypotheses were:

(1) Group climate of individual openness, rational argumentation, decision-making quality and consensus are significantly related to each other.

(2) Decision-making quality is significantly related to the linear combination of group climate of individual openness and rational and argumentation.
Table 4
Summary of Correlations Between Items On the Rational Argumentation Measure and the Learning Culture Measure.

<table>
<thead>
<tr>
<th>Items of RA</th>
<th>LC Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.56</td>
</tr>
<tr>
<td>2</td>
<td>0.53</td>
</tr>
<tr>
<td>3</td>
<td>0.60</td>
</tr>
<tr>
<td>4</td>
<td>0.50</td>
</tr>
<tr>
<td>5</td>
<td>0.51</td>
</tr>
<tr>
<td>6</td>
<td>0.53</td>
</tr>
<tr>
<td>7</td>
<td>0.53</td>
</tr>
<tr>
<td>8</td>
<td>0.58</td>
</tr>
<tr>
<td>9</td>
<td>0.58</td>
</tr>
<tr>
<td>10</td>
<td>0.41</td>
</tr>
<tr>
<td>11</td>
<td>0.49</td>
</tr>
<tr>
<td>12</td>
<td>0.46</td>
</tr>
</tbody>
</table>
(3) The proportion of decision-making quality accounted for uniquely by group climate of individual openness or rational argumentation is significantly different.

(4) Consensus is significantly related to the linear combination of group climate of individual openness, and rational argumentation.

(5) The proportion of consensus accounted for uniquely by group climate of individual openness or rational argumentation in the population is significant.

(6) The linear combination of group climate of individual openness, and rational argumentation is significantly related to the linear combination of decision-making quality and consensus.

(7) Group climate of individual openness contributes to the linear combination of decision-making quality and consensus (or respectively, decision-making quality and consensus) significantly different from rational argumentation does.

(8) The linear combination of group climate of individual openness and rational argumentation contributes to decision-making quality significantly different from to
To test the hypotheses, Pearson correlation (PC), stepwise multiple regression (SMR) and canonical correlations (CC) analyses were performed. The independent variables for SMR and CC analyses were group climate of individual openness, rational argumentation, and learning culture. These were identified by twenty-five school decision-making groups. These dependent variables for SMR and CC were decision-making quality and consensus. These dependent variables were also identified by the same school decision-making groups. A summary of the twenty-five group means for all five variables and the merged one is given below.

Correlation Among Variables

The Pearson correlation coefficients for the five variables are summarized in Table 5. The analysis yielded correlation coefficients between .70 and .99 between rational argumentation and consensus, and between consensus and decision-making quality. In addition, the analysis produced correlation coefficients between .50 and .69 that include group climate of individual openness and rational argumentation, between individual openness and consensus, and between rational argumentation and decision-making quality. Finally, the analysis found correlation coefficients between .30 to .49 between group climate of individual openness and decision-making quality.
Table 5
Summary of Pearson Correlation Coefficient Among IO, RA, DMQ, and CO Variables

Table 5: Correlations for the Long and Short Measure of DMQ

<table>
<thead>
<tr>
<th>Var.</th>
<th>IO</th>
<th>RA</th>
<th>DMQ</th>
<th>CO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Long</td>
<td>Short</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IO</td>
<td>1.00</td>
<td>.53</td>
<td>.42</td>
<td>.43</td>
</tr>
<tr>
<td>RA</td>
<td>.53</td>
<td>1.00</td>
<td>.76</td>
<td>.59</td>
</tr>
<tr>
<td>DMQ(L)</td>
<td>.42</td>
<td>.76</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>DMQ(S)</td>
<td>.43</td>
<td>.59</td>
<td>1.00</td>
<td>.71</td>
</tr>
<tr>
<td>CO</td>
<td>.64</td>
<td>.76</td>
<td>.78</td>
<td>.71</td>
</tr>
</tbody>
</table>
Decision-Making Quality Predicted by Group Climate of Individual Openness, Rational Argumentation and Their Interaction

Analyses for the Short Measure of Decision-Making Quality

The stepwise multiple regression analysis for decision-making quality predicted by group climate of individual openness, rational argumentation, and their interaction is summarized in Table 6. According to Table 6.1, this analysis yielded a significant F (p<0.0019) and an R-square value of .35, meaning that decision-making quality is predicted by individual openness, rational argumentation and their interaction. According to Table 6.2, only the interaction of group climate of individual openness and rational argumentation entered into this model. This analysis yielded an R-square value of .35, indicating that 35% of the variance in decision-making quality, as measured by the short measure, is accounted for by the interaction of group climate of individual openness and rational argumentation significantly. No other variables entered into the model. Therefore, the proportion of decision-making quality accounted for by the interaction of group climate of individual openness and rational argumentation is almost the same as for all variables.

Consensus Predicted by Group Climate of Individual Openness, Rational Argumentation and their Interaction

The stepwise multiple regression analysis for consensus predicted by group climate of individual openness, rational
Table 6
Summary of Stepwise Multiple Regression For DMQ
Explained by IO, RA, and IOxRA

Table 6.1: The Analysis of Multiple Regression
R-Square=0.35

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>P&gt;f</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>8.7</td>
<td>1</td>
<td>8.7</td>
<td>12.26</td>
<td>0.0019*</td>
</tr>
<tr>
<td>Error</td>
<td>16.32</td>
<td>23</td>
<td>0.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>25.02</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* represents the null hypothesis was rejected.

Table 6.2: The Steps of Stepwise Multiple Regression

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>Number</th>
<th>Partial R**2</th>
<th>F</th>
<th>P&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IOxRA</td>
<td>1</td>
<td>0.35</td>
<td>12.26</td>
<td>0.0019</td>
</tr>
</tbody>
</table>

** No other variable entered into the model.
argumentation and their interaction is summarized in Table 7. 
According to Table 7.1, this analysis yielded a significant F (p<0.0001) and an R-square value of .65, meaning that consensus can be predicted by group group climate of individual openness, rational argumentation (or learning culture) and their interaction. According to Table 7.2, only the interaction of group climate of individual openness and rational argumentation entered into this model. This analysis yielded an R-square value of .65, indicating that 65% of the variance in consensus is accounted for by the interaction of group climate of individual openness rational argumentation significantly. No other variables entered into the model. Therefore, the proportion of consensus accounted for by the interaction of group climate of individual openness and rational argumentation is almost the same as for all variables.

Decision-Making Quality Explained by Individual Openness, and Rational Argumentation in Canonical Correlation Model

Analyses for the Short Measure of Decision-Making Quality

In comparing Table 8.1 with Table 5, the first canonical correlation is .61, which would appear that a significant relationship between the linear combination of group climate of individual openness and rational argumentation and the short measure of decision quality was found. The probability level for the null hypothesis that all canonical correlations are 0 in the population is only 0.0064 so firm conclusions can be drawn from this information.
Table 7
Summary of Stepwise Multiple Regression For CO Explained by IO, RA, and IOxRA

Table 7.1: Consensus Was Predicted By IO, RA, and IOxRA
R-Square= .65

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>P&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>161.6</td>
<td>1</td>
<td>161.6</td>
<td>42.01</td>
<td>0.0001*</td>
</tr>
<tr>
<td>Error</td>
<td>88.5</td>
<td>23</td>
<td>3.85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>250.1</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* represents the null hypothesis was rejected.

Table 7.2: The Steps of Stepwise Multiple Regression

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>Number</th>
<th>Partial R**2</th>
<th>F</th>
<th>P&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entered</td>
<td>IOxRA</td>
<td>1</td>
<td>.65</td>
<td>42.01</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

** No other variables entered the model
According to Table 8.2, the square multiple correlations indicate that the first canonical variable of group climate of individual openness, and rational argumentation has some predictive power to decision-making quality (.37). Rational argumentation only has some predictive power to the first canonical variable of decision-making quality (.35), and group climate of individual openness is a poor predictor of the first canonical variable of decision-making quality (0.1871). Rational argumentation has better predictive power on decision-making quality than that of group climate of individual openness.

Consensus Explained by Group Climate of Individual Openness and Rational Argumentation in Canonical Correlation Model

In comparing Table 9.1 with Table 5, the first canonical correlation is .81, which would appear to be substantially larger than any of the between-set correlations. The probability level for the null hypothesis that all canonical correlations are 0 in the population is only 0.0001; so, firm conclusions can be drawn from this information.

According to Table 9.2, the squared multiple correlations indicate that the first canonical variable of group climate of individual openness combined with rational argumentation are fairly good predictors of consensus (.66). Rational argumentation is a fairly good predictor of the first canonical variable of consensus (.57), and group climate of individual openness only has some power for predicting the first canonical variable of consensus (.41). Rational argumentation has a little more predictive power for decision-making quality than group
Table 8
Summary of The Canonical Correlation for DMQ Explained by IO and RA

Table 8.1: Canonical Correlations

<table>
<thead>
<tr>
<th>Canonical Correlation</th>
<th>Approx. F</th>
<th>Num. DF</th>
<th>Den DF</th>
<th>Pr.&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.61</td>
<td>6.4</td>
<td>2</td>
<td>22</td>
</tr>
</tbody>
</table>

Table 8.2:

Square Multiple Correlations between the DMQ Variable with the first "M" Canonical Variables of IO and RA

<table>
<thead>
<tr>
<th>DMQ</th>
<th>.3680</th>
</tr>
</thead>
</table>

Square Multiple Correlations between IO, and RA variables and the first "M" Canonical Variable of the DMQ Variable

<table>
<thead>
<tr>
<th>IO</th>
<th>0.1871</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA</td>
<td>0.3476</td>
</tr>
</tbody>
</table>
climate of individual openness only has some power for predicting the first canonical variable of consensus (.41). Rational argumentation has a little more predictive power for decision-making quality than group climate of individual openness.

Consensus and Decision-Making Quality Explained by Group Climate of Individual Openness and Rational Argumentation in the Canonical Coefficient Model

In comparing Table 10.1 with Table 5, the first canonical correlation is .81, which would appear to be substantially larger than any of the between-set correlations. The second canonical correlation is .11. The probability level for the null hypothesis that the first canonical correlations and the second canonical correlations are 0 in the population is only 0.0001, so the F statistic for the first canonical correlation is significant and firm conclusions can be drawn. On the other hand, the probability level for the null hypothesis that the second canonical correlations are 0 in the population is .62, so the F statistic for the second canonical correlation is not significant and no firm conclusions can be drawn. Only the first canonical correlation can be explained by this model.

According to Table 10.2, the squared multiple correlations indicate that the first canonical variable of group climate of individual openness, and rational argumentation is a fairly good predictor of consensus (.66), but has only some power for predicting decision
Table 9

Summary of the Canonical Correlation for CO Explained by IO and RA

Table 9.1: Canonical Correlation

<table>
<thead>
<tr>
<th>Canonical Correlation</th>
<th>Approx. F</th>
<th>Num. DF</th>
<th>Den DF</th>
<th>Pr.&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.81</td>
<td>21.07</td>
<td>2</td>
<td>22</td>
</tr>
</tbody>
</table>

Table 9.2: CO Was Explained By IO and RA

Square Multiple Correlations between the CO Variable with the First "M" Canonical Variables of IO, and RA

<table>
<thead>
<tr>
<th></th>
<th>CO</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.6570</td>
<td></td>
</tr>
</tbody>
</table>

Square Multiple Correlations between IO, RA, and LC Variables and the First "M" Canonical Variable of the CO Variable

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IO</td>
<td>RA</td>
</tr>
<tr>
<td></td>
<td>0.4149</td>
<td>0.5744</td>
</tr>
</tbody>
</table>
quality (.36). The linear combination of group climate of individual openness and rational argumentation is a better predictor of the short measure of decision quality than that of consensus.

Individual openness has some power for predicting the first canonical variable of decision quality and consensus (.41). Rational argumentation is a fairly good predictor of the first canonical variable of decision quality and consensus (.58). Rational argumentation is a better predictor of the first canonical variable of decision quality and consensus than is group climate of individual openness.
Table 10
Summary of Canonical Correlation for DMQ and CO
Explained by IO and RA

Table 10.1: Canonical Correlation

<table>
<thead>
<tr>
<th>Canonical Correlation</th>
<th>Approx. F</th>
<th>Num. DF</th>
<th>Den DF</th>
<th>Pr.&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.81</td>
<td>7.56</td>
<td>4</td>
<td>42</td>
</tr>
<tr>
<td>2</td>
<td>.11</td>
<td>0.26</td>
<td>1</td>
<td>22</td>
</tr>
</tbody>
</table>

Table 10.2: DMQ and CO Were Explained by IO and RA

Square Multiple Correlations between the DMQ and CO Variables with the First “M” Canonical Variables of IO and RA

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMQ</td>
<td>.3628</td>
<td>.3680</td>
</tr>
<tr>
<td>CO</td>
<td>.6569</td>
<td>.6570</td>
</tr>
</tbody>
</table>

Square Multiple Correlations between IO, and RA Variables and the First “M” Canonical Variable of the DMQ and CO Variables

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO</td>
<td>.4122</td>
<td>.4166</td>
</tr>
<tr>
<td>RA</td>
<td>.5775</td>
<td>.5789</td>
</tr>
</tbody>
</table>
Summary

Hypothesis 1

The Pearson correlation analysis was conducted to test hypothesis one (see Table 5). According to the statistician, Davis's model (1971), the relationship between rational argumentation and consensus, and between consensus and decision-making quality was very high. In addition, the relationship between group climate of individual openness and rational argumentation, rational argumentation and decision-making quality, and between group climate of individual openness and consensus, was substantial. Finally, the relationship between group climate of individual openness and rational argumentation, and between group climate of individual openness and decision-making quality was moderate.

Discussion

Based on the results of these analyses, it was concluded that group climate of individual openness, rational argumentation, decision-making quality and consensus were related to each other. Individuals were willing to question each other and themselves honestly and group members examined systematically and logically from two or more points of view to solve a controversial issue, which helped a group to reach consensus and achieve a good decision. These four factors were indispensable for group decision-making. However, the extent of correlation between different factors varied. Among the four factors, the most significant relationship was found between
rational argumentation and decision-making quality, and between rational argumentation and consensus. When group members exchanged information by logical and reasoned justification to solve issues, consensus could be high and decision quality could be good.

The relationship between group climate of individual openness and consensus was higher than that between group climate of individual openness and decision quality. When individuals could express themselves candidly and reflected on their own ideas in group decision-making, thinking and consensus were identified more often than decision quality. The relationship between rational argumentation and consensus was higher than that between group climate of individual openness and consensus. Rational argumentation was a kind of two-way communication and group members could identify each other. On the other hand, group climate of individual openness only stressed one-way communication and ignored others' feedback. It appears that two way communication helped group members reach consensus more than one way communication.

**Hypotheses 2 and 3**

**Decision Quality Predicted by Group Climate of Individual Openness and Rational Argumentation**

When group climate of individual openness, rational argumentation, and their interaction, and the short measure decision-making quality entered into the SMR model (see Table 6), a significant linear relationship was found between the linear combination of group
climate of individual openness, rational argumentation and their interaction, and the short measure of decision-making quality. Because only the interaction of group climate of individual openness and rational argumentation entered into the model, the short measure of decision-making quality was not accounted for uniquely by any one factor (see Table 6).

**Hypotheses 4 and 5**

**Consensus Predicted by Group Climate of Individual Openness and Rational Argumentation**

When group climate of individual openness, rational argumentation, and their interaction, and decision-making quality entered into the SMR model (see Table 7), the significant relationship was found between the linear combination of group climate of individual openness, rational argumentation and their interaction, and consensus. However, because only the interaction of group climate of individual openness and rational argumentation entered into the model, consensus could not be accounted for uniquely by any one factor.

**Discussion**

Based on the analyses of the stepwise multiple regression, any linear combination of group climate of individual openness, rational argumentation and their interaction was related significantly to decision-making quality and consensus. When group members could open their mind to speak out honestly and data and evidence were
also fostered to solve controversial issues among members at the same time, members perceived that a good decision had been made and consensus had been reached. Because group climate of individual openness, rational argumentation, their interaction, and consensus or decision quality significantly related to each other, the proportion of the variance has overlapped. When the overlapped variance was partialed out, the remaining variance of each factor beyond other factors could not predict consensus or decision quality well. Therefore, consensus or decision quality could not be accounted for uniquely by any one factor beyond another factor. When individuals could speak out their opinions freely, but rational discussions were ignored, free speaking was not useful for reaching consensus or achieving a good decision. On the other hand, when group members exchanged information by logical and reasoned justification to solve issues, but they didn't open their mind to accept different opinions, rational justifications were not used well to promote decision quality and reach consensus.

**Hypotheses 6, 7, and 8**

**Decision Quality Predicted by Group Climate of Individual Openness and Rational Argumentation**

The canonical correlation model was used to investigate hypotheses six, and seven. Based on the analysis of the canonical correlation, a correlation was found between the linear combination of group climate of individual openness, and rational argumentation and
the short measure of decision quality. It also helped to distinguish whether rational argumentation contributed to the short measure of decision quality significantly and was differently different from individual openness.

**Consensus Predicted by Group Climate of Individual Openness and Rational Argumentation**

The canonical correlation model was used to investigate hypotheses six and seven. Based on the analysis of the canonical correlation, a correlation was found between the linear combination of group climate of individual openness, and rational argumentation and consensus. It also helped to distinguish that rational argumentation contributes to consensus and was significantly different from group climate of individual openness.

**Discussion**

A significant correlation was found between the linear combination of group climate of individual openness and rational argumentation and the short measure of decision-making quality (see Table 8). Group climate of individual openness was a poor predictor of decision quality. Rational argumentation had some power for predicting the decision-making quality. Rational argumentation had more power for predicting decision quality than group climate of individual openness had.

A significant correlation was found between the linear combination of group climate of individual openness and rational argumentation and consensus (see Table 9). Group climate of
individual openness had some power for predicting consensus. Rational argumentation was a fairly good predictor of consensus. Rational argumentation had a little more power for predicting consensus than group climate of individual openness had. Group climate of individual openness had more power for predicting consensus than decision quality.

When group members spoke out their ideas and reflected on their own ideas and they also used data and evidence to solve controversial issues, cooperation for implementing that decision was reached and a good quality decision was achieved.

Rational argumentation stressed that different assumptions were surfaced by logical justifications and then synthesized an appropriate conclusion. Group climate of individual openness only stresses individuals should not withhold information and should try to reflect on their own ideas, but it assumes that individuals' positions are more important than the problem. Therefore, rational argumentation influenced consensus and decision quality more than did group climate of individual openness.

Because group climate of individual openness made individual value and meaning respected in group decision-making, members was likely to identify their group. However, individual free speaking could ignore problem-centered diagnosis and the purpose, which made a decision ineffective.
Decision Quality and Consensus Predicted by Group Climate of Individual Openness, and Rational Argumentation

The canonical correlation model was used to investigate hypotheses six, seven, and eight. Based on the analysis of the canonical correlation, a correlation was found between the linear combination of individual openness and rational argumentation and the linear combination of the short measure of decision quality and consensus. It also help to distinguish whether rational argumentation contributed to the linear combination of the short measure of decision quality and consensus and was significantly different from that of group climate of individual openness. It also discerned whether the linear combination group climate of individual openness and rational argumentation contributed to the short measure of decision quality and to consensus and was significantly different.

Discussion

A significant correlation was found between the linear combination of group climate of individual openness, and rational argumentation and the linear combination of decision quality and consensus (see Table 10). Group climate of individual openness had some power for predicting the linear combination of decision quality and consensus. Rational argumentation was a fairly good predictor of the linear combination of decision quality and consensus. Rational argumentation had more more power for predicting the linear combination of decision quality and consensus than did group climate of individual openness.

The linear combination of group climate of individual openness
and rational argumentation was a fairly good predictor of consensus, but it had only some power for predicting decision quality. Thus, the linear combination of group climate of individual openness and rational argumentation had more power for predicting consensus than for predicting decision quality.

When group members spoke out their ideas freely and reflected on their own ideas and they also used data and evidence to solve controversial issues, the group effectiveness— the combination of a good decision and cooperation for implementing that decision— was achieved.

Rational argumentation helped to surface different assumptions by logical justifications and then synthesized an appropriate conclusion. Two-way communication avoided misunderstanding of communication. Group climate of individual openness only stressed that individuals should not withhold information and should try to reflect on their own ideas, but it assumes that individuals' position was more important than the problem or a group's position. Therefore, rational argumentation positively influenced the combination of consensus and decision quality more than did group climate of individual openness.
Chapter V

Findings, Implications And Recommendation

This chapter provides a summary of this study. Based on the results of this study, a discussion of the research findings, implications and recommendations will be described in the chapter.

Structure of the Study

Teams, as units of decision-making, are commonly used for solving a school's problems. The review of the literature (see Chapter 2) indicates how individual factors, group factors and environmental factors influence group decision-making. Basically, this study has developed a model to increase a group's ability to enhance decision-making quality and to reach consensus through individuals' interaction within group, rational argumentation and the learning characteristics of the group's external environments. Research has suggested how these three factors can contribute to the resolutions of issues and overcome the inertia of human problem-solving to make a decision more acceptable and better.

This study was designed to examine two problems. First: What are the interrelationships among individuals' interaction within group, rational argumentation, learning culture, decision-making quality and consensus? Second: How are individual openness, rational
argumentation and learning culture associated with decision-making quality, consensus or their combination. The two problems were investigated in twenty-five natural decision-making groups, whose members include teachers and administrators from sixteen different schools. The twenty-five natural decision-making groups involved in this study held regular meetings for solving problems in their schools. Data were collected to investigate personal member's perception of individual, group and environmental characteristics. Each member of the group was invited to fill out five instruments to measure five factors: individual openness, rational argumentation, learning culture, decision-making quality, and consensus.

The research design employed in testing these hypotheses was a relational research design. In this study, the dependent variables consisted of decision-making quality and consensus. The independent variables consisted of group climate of individual openness, rational argumentation, and learning culture. A Pearson correlation was performed to find the relationship among the five variables. A stepwise multiple regression was performed to determine if there were significant linear relationships between group climate of individual openness, rational argumentation, and learning culture, and decision-making quality and consensus. This approach was used to explore whether each dependent variable was related to each independent variable if other factors were eliminated. Finally, a canonical correlation model was applied to determine whether a significant relationship was created by combining individual openness, rational argumentation and learning culture to explain the combination of
decision-making quality and consensus or consensus and decision-making quality, independently. The model was also used to determine which factor was more important for predicting decision-making quality and consensus, or their combination.

**Findings, Discussions and Conclusions:**

The data generated by this study on how group climate of individual openness, rational argumentation, and learning culture influence decision-making quality and consensus provided some interesting information. Evidence was found which supported six of the eight hypotheses developed in this study. The following findings are used to summarize this research:

1. The items used in the long measure of decision quality were tautologically related to items used to measure the independent variables. Consequently, the long measure was not used in the study.

2. The items used in the rational argumentation measure were tautologically related to items used to measure the learning culture. Consequently, learning culture was dropped from the study and will be the subject of further investigation.

3. Teachers and administrators on school decision-teams reported significant relationships existed among group climate of individual openness, rational argumentation, consensus, and decision-making quality.
4. Decision quality was significantly influenced significantly by the combination of group climate of individual openness and rational argumentation.

5. Decision quality was not accounted for uniquely by group climate of individual openness of the group and rational argumentation.

6. Decision quality was significantly influenced significantly by the combination of group climate of individual openness of the group and rational argumentation.

7. Consensus was not accounted for uniquely by group climate of individual openness of the group and rational argumentation.

8. The combination of decision quality and consensus was significantly influenced by the combination of group climate of individual openness and rational argumentation.

9. Group climate of individual openness and rational argumentation had significantly different powers for predicting decision-making quality.

10. Group climate of individual openness rational argumentation had significantly different powers for predicting consensus.
11. Group climate of individual openness and rational argumentation had significantly different powers for predicting the combination of decision quality consensus.

12. The combination of group climate of individual openness of the group and rational argumentation had significantly different powers for predicting decision-making and for predicting consensus.

1. The items used in the long measure of decision quality were tautologically related to the items used to measure the independent variables."

Testing the Value of a Succinct Measure of Decision Quality

The ten items for measuring decision-making quality include measures of procedural quality (the first eight items) and the outcome of decisions (the last two items). However, the measures of the procedure in this instrument of decision-making quality seemed to also measure group climate of individual openness and rational argumentation. According to the cross-item analysis among the measure of decision-making quality for the first eight items and the measure of group climate of individual openness, the correlation coefficients were between .40 and .00 and most of them were near .20 and .00. Therefore, it seems safe to say that the measures of decision-making quality in the long measure and group climate of individual openness are independent. On the other hand, according to the cross-item analysis of the measure of decision-making quality for the first
eight items and rational argumentation, the correlation coefficients were between .50 and .70. Most of them are near .60. Thus, the instrument of decision-making quality used for measuring the procedure quality might depend on the instrument measuring rational argumentation.

However, in order to assure that the measure of quality was not artificially correlated with the measures of group climate of individual openness and rational argumentation, the data were analyzed using only items nine and ten, which were direct measures of the perceived quality of the decisions made by the group.

Almost the same correlation coefficients were found for the correlation between individual openness of the group and decision quality using the long (.42) and the short (.43) measure of decision quality. On the other hand, different correlation coefficients were found for the correlation between rational argumentation and decision quality using the long and the short measure of decision quality.

From this analysis, it obviously does not matter if the long measure or the short measure is used to determine the correlation between decision making quality and group climate of individual openness. On the other hand, the correlation coefficients between decision quality and rational argumentation using the long measure was .76 and the short measure was .59. This result supports the suspicion that the measure of quality was tautologically correlated with the measure of rational argumentation using the long measure. The items used in the long measure of decision quality were tautologically related to the items used to measure the independent variables. Thus,
the short measure is the better measure and is not tautological with the independent variables. In the following analyses, the short measure of decision quality was used to analyze the results.

2. The items used in the rational argumentation measure were tautologically related to the items used to measure the learning culture.

"Rational Argumentation Seems to be Testing the Same Thing as Learning Culture"

After the data were collected, the original idea to separate the rational argumentation measure from the learning culture measure appeared to be flawed. First, several observers felt that some of the items in the rational argumentation measure were similar to items on the learning culture measure. This raised a question of whether any observed correlation between the rational argumentation measure and the learning culture could be spurious, reflecting merely that they were defined by the same operational measures.

The cross-item correlations among all the measures showed high correlations between items on the learning culture measure and the rational argumentation measure (.40 to .60). In other words, correlations between items on the rational argumentation measure and items on the learning culture measure indicate the possibility of a tautological relationship.

Consequently, the hypothesis: "The items used in the rational argumentation were tautologically related to the learning culture
measure" was not rejected.

Analysis of the data using both measures indicates that the null hypothesis must be rejected. The rational argumentation measure and the learning culture measure seemed to test the same thing. Rational argumentation and learning culture were merged and became one measure which was used to analyze the data. The score of rational argumentation plus learning culture became a new score for analyzing this study. The following analysis assumes that the instruments measure rational argumentation.

3. The group climate of individual openness, rational argumentation, decision quality and consensus were related to each other.

The data generated in this study indicate that the group climate of individual openness and rational argumentation were significantly related to decision-making quality and consensus.

Discussion
This conclusion suggested that group climate of individual openness and rational argumentation were important factors for group decision-making. It was concluded that group climate of individual openness, rational argumentation, decision-making quality and consensus were related to each other. Individuals were willing to question each other and themselves honestly and group members examined questions and solutions systematically and logically from two or more points of view to solve controversial issues, which could help a group to reach consensus and achieve a good decision. The members' motivation for participation had been promoted and different positions and values
had been identified.

4. Decision quality was significantly influenced by the combination of group climate of individual openness and rational argumentation. The data generated in this study indicate that the linear combination of group climate of individual openness and rational argumentation generated a significant influence on decision quality.

Discussion

When group members could open their mind to express themselves candidly and reflected on their ideas and logic and reason was also fostered to solve controversial issues among members at the same time, members perceived that a good decision had been made.

5. Decision quality was not accounted for uniquely by group climate of individual openness and rational argumentation.

The data generated in this study indicate that decision quality was not influenced significantly by one factor beyond another factor.

Discussion

When individuals could speak out their opinions freely, but rational discussions were ignored, free speaking was not useful for achieving a good decision. On the other hand, when group members exchanged information by logical and reasoned justification to solve issues, but they didn't open their mind to accept different opinions, rational justifications that might only serve self-ideology and self-logic were not used well to promote decision quality. In this case, rational argumentation could turn into perpetual criticism of other values.
Individual openness of the group needed rational discussions for arriving at a good decision quality. Rational argumentation influenced a good decision only when combined with the group climate of individual openness.

6. Consensus was significantly influenced by the combination of group climate of individual openness and rational argumentation.

The data generated in this study indicate that the linear combination of group climate of individual openness and rational argumentation generated a significant influence on consensus.

Discussion
When group members could open their mind to express themselves candidly and reflected on their ideas and the climate of rational dialogue was also fostered to solve controversial issues at the same time, members reached consensus more often.

7. Consensus was not accounted for uniquely by group climate of individual openness and rational argumentation

The data generated in this study indicate that consensus was not influenced by either factor beyond the other.

Discussion
When individuals could speak out their opinions freely, but rational discussions were ignored, the free speaking did not seem to foster cooperation to implement a decision. Self-centered thinking didn't foster willingness to cooperate with others. On the other hand, when group members exchanged information through logical and
reasoned justification to solve issues, but they didn't open their mind to accept different opinions, rational justifications were not used well to promote decision quality. In this case, members' thinking became self-rationalization. The group climate of individual openness needed rational discussions to function for reaching consensus. Rational argumentation influenced consensus on a decision only with the group climate of individual openness.

8. The combination of decision quality and consensus was influenced by the combination of the group climate of individual openness and rational argumentation.

The data generated in this study demonstrates that the linear combination of individual openness and rational argumentation had very strong power for predicting the combination of decision quality and consensus.

Discussion

When group members became willing to have their thinking influenced by one another and they could provide evidence and show arguments for and against each position to make underlying explicit assumptions for problem-solving at the same time, a group could achieve high effectiveness. A good decision could be achieved and the group committed collective energy to implement that decision effectively.

The findings indicate that a group's ability to reach consensus or/and achieve good decision quality could be maximized not only by individuals' free speaking, but also by members' supplying supportive
concrete data.

The overall effectiveness of a decision-making group's consensus and decision quality was significantly contributed to by the combination of the group climate of individual openness and rational argumentation. By considering both individual openness and rational argumentation simultaneously, the most effective method for group decision-making could be achieved. When group members spoke out their ideas freely and reflected on their own ideas and they also used the data and evidence to solve controversial issues, cooperation for implementing that decision was reached and a good quality decision was achieved.

9. The group climate of individual openness and rational argumentation had different powers for predicting decision-making quality

Based on the analysis of canonical correlation, the data generated in this study demonstrate that the combination of individual openness and rational argumentation had some power for predicting decision quality. However, individual openness less powerfully predicted decision quality. Rational argumentation had some power for predicting decision quality. Rational argumentation had more influence on decision quality than did individual openness. Also, individual openness of the group was a poorer predictor of decision quality than rational argumentation.
Discussion

Rational argumentation stressed that members surface different assumptions by logical justifications to solve controversial issues and synthesized an appropriate conclusion. It also was a kind of two-way communication and then a misunderstanding could be avoided. The group climate of individual openness only stresses that individuals should not withhold information and should try to reflect on their own ideas, but it assumes that individuals' positions are more important than the problems or the group's position. Individual openness in a group might produce high identification toward the group, but decision quality might be threatened. Consequently, rational argumentation, which emphasizes full disclosure of a maximum number of facts and full discussion of counter-positions, influenced decision quality more than did individual openness.

10. The group climate of individual openness and rational argumentation had different power for predicting consensus.

   Based on the canonical correlation, the data generated in this study indicated that the combination of individual openness and rational argumentation had strong powers for predicting consensus. However, individual openness had only low-moderate power for predicting decision quality. Rational argumentation had moderate power as a predictor of decision quality. Rational argumentation had a little more influence on consensus than individual openness.

   Individual openness was a poorer predictor of decision quality than rational argumentation. Individual openness had more influence
on consensus than decision quality.

11. **Group climate of individual openness and rational argumentation had different powers for predicting the combination of decision quality and consensus**

   Based on the analysis of canonical correlation, the data generated in this study indicate that the combination of group climate of individual openness and rational argumentation had strong power for predicting the combination of decision quality and consensus. Taken separately, the group climate of individual openness had some power for predicting the combination of decision quality and consensus. Rational argumentation was a fairly good predictor of the combination of decision quality and consensus. Rational argumentation had more influence than group climate of individual openness on the combination of decision quality and consensus.

**Discussion**

According to question ten and eleven, rational argumentation was a better predictor than group climate of individual openness on the combination of decision quality and consensus. Individual openness was a measure of the degree to which each person could express information candidly and they could question each other, which focused on individual positions. Decision quality might be threatened if discussion, not matter how open, ignored comprehensive discussion of problems' reality. This might ignore other perspectives which could surface different assumptions. Thus, when full and opposing information was exchanged with supporting
data and evidence, and ethical concerns were considered, a better
decision could be achieved. Thus, a group's intellectual for problem-
solving is more than the totality of each individual intelligence (Swalp,
1984).

Also, rational argumentation stressed reciprocal communication.
Two way communication decreased misunderstanding, which could
occur if individual propositions were stressed (Schmuck and Runkel,
1972). Thus, reciprocal communication promoted cooperation for
implementing a decision. Rational argumentation was more important
than individual openness for increasing a group's effectiveness.
Rational argumentation like the pattern of Brown's (1983) problem-
solving, often involves trust, open and accurate exchange of
information, and a desire for cooperation.

12. The combination of group climate of individual openness and
rational argumentation had different powers for predicting decision-
making and for predicting consensus.

The data generated in this study indicate that the combination of
group climate of individual openness and rational argumentation had
only some power for predicting decision quality, but had stronger
power for predicting consensus. This combination had more influence
on consensus than decision quality. The combination of group climate
of individual openness of the group and rational argumentation was a
better predictor of consensus than decision quality.

Discussion

Rational argumentation was a kind of reciprocal communication.
This two-way communication decreased members' misunderstanding and people desired to arrive at some conclusion. A good decision was achieved and cooperation for implementing that decision was reached.

Also, when individuals showed a high willingness to speak out their ideas, the process promoted high motivation in discussions. This group could be identified by members. But, free speaking sometimes might ignore a true problem diagnosis and decision quality might be threatened. From the analysis, when group members used data to solve issues and they showed a high willingness to speak out the ideas, consensus was more easily reached than a good decision was achieved.

Discussion About Modifying the Instruments:

Though the tautological relationships among the items appeared early in the study, analysis of data from the pilot study gave no reason to make major modifications. So, data were collected using the instruments as they were.

However, the possibility that they still could introduce bias into the analysis led to intensive examination after all data were collected. In the larger sample, the possible weakness were magnified enough to cause modifications discussed in Chapter 4.

Sequent study in the phases that follow this dissertation will be used to conduct even more powerful measures and to analyze the data using these measures.
Discussion About Revising the Model of this Study

**Group Size** The small groups of three have been chosen to conduct this study. When the group size is considered as a variable, the results might change. As group size increases, a large number of intellectuals are available for acquiring and processing information (Shaw, 1981). On the other hand, in a large group, some opinions can be ignored. Thus, the group size affects decision quality and should be added to the model in future research.

**Leadership** Agreement on leadership will produce satisfaction in group decision-making (Collin, 1984). Lewin, Lippit, and White (1960), classified three styles of leadership: democratic, autocratic, and laissez-faire. Sashkin (1971) found that democratic leadership led to better decision quality. Thus, democratic leadership can be added to this model in future research.

**Knowledge** The identification of a problem often requires measurable expertise (Moreland & Levine, 1992). Thus, group members' professional knowledge related to the problems can be added to the model.

**History** When group members try to identify a problem, they frequently analyze a problem from historical perspectives. However, these historical perspectives used as an immediate source of information produces doubtful assumptions. Therefore, the model can add the factor of exploring whether members analyze problems through historical perspectives.

**Information** The characteristics of the information influence group
decision-making (Calder & Schurr, 1981). The direction for purpose, persuasiveness, and novelty of information often improve decision quality. Thus, these three characteristics of the information can be constructed as a factor of the model.

**Status** The status effect influences group decision-making. The perceived effect of status can be added to the model.

**Heuristic** Judgments usually are undermined by individual's intuitions. Therefore, this model can add a factor, the extent to which an individual's judgments are based on memory and intuition.

**Problem Characteristic** The problems' characteristics often influence members' intellectual to identify a problem (Nutt, 1989). Familiarity with the problem habitualizes members' thinking and some new information can be ignored. Therefore, whether group members are familiar with the problems in decision-making process can be added to revise the model.

**Culture** This study was conducted in the United States. The study can be also conducted in Taiwan. Then, the comparison of a cross culture might be explored to revise this model.

**Implications for Practicing Administrators:**

An initial goal of this investigation was to identify factors that could help decision-making groups in a school function effectively. Based on the findings of this study, group climate of individual openness and rational argumentation, or their linear combination are related to decision-making quality and consensus. Some implications will be described for using in practical administrative work.
Organizational Leadership Is Important for Group Decision-Making

Organizational culture is significantly influenced by leadership (Schein, 1985). An organizational culture that suggests learning is important for group decision-making in school systems. A principal’s leadership that promotes organizational learning can make group decision-making effective.

How does a principal foster group climate of individual openness and rational argumentation in his/her organization? Some learning principles are suggested as follows. First, the principal should use a group to solve organizational problems that affect the whole group or large portions of it. Second, the principal should actively provide teachers with rewards to encourage them to create and implement new ideas. Third, the principal should encourage people to challenge the existing organizational norms and values. An organizational goal should be to test whether norms or values are useful or not and replace unproductive ones. Fourth, the principal should encourage people to define a common purpose when implementing a plan. Finally, when the principal needs to discuss something with the teachers, analysis should encompass the whole system, thus clarifying organizational reality.

An Emerging Climate of Rational Argumentation Should Be Developed for Group Decision-Making

Rational argumentation contributes to members’ learning. When learning is not valued by a school, group discussions tend to be
irrational and less effective. The climate of a decision-making group can be developed over time. It is possible to develop an emergent climate of rational argumentation for problem-solving. From this analysis, when an organization has low learning characteristics, the leaders of a decision-making group should make efforts to develop a climate for rational discussions. When the organizational has accepted learning as a value, decisions will be more effective.

**The Openness Of Leaders**

An organizational culture is significantly influenced by a leader such as the school principal. When an organization does not value learning and group decision-making is irrational, the role of the leader is crucial for changing the situation.

According to this analysis, the interaction of rational argumentation and individual openness has more influence to attain group effectiveness than by either taken independently. The openness of the leader promotes other members' openness, and is the first step toward changing the organizational or group climate. A principal or a leader usually is the most influential person in the group. The question is whether the leader can open his/her mind to accept the challenge or to question himself/ herself. Doing so begins to create a learning culture and the rational argumentation that makes decisions effective. Although individual openness is a poorer predictor of decision quality, it has significant influence on consensus and is an important catalyst for increasing rational argumentation. The openness of leaders who influence others can encourage rational argumentation and indirectly
promote decision-quality and support consensus.

**Recommendations for Practice**

The results of this study suggest strongly that trainers and managers will enhance decision quality and consensus more powerfully by creating a group climate that fosters two-way communication supported by data and logic, particularly in situations fraught with controversy. More attention should be given to improving a predisposition toward rational argumentation then merely enabling people to be open to the ideas of others. Openness to sending accurate message seems as important as openness to hearing accurately.

In order to encourage two-way communication, trainers and managers needs to help group members develop communication skills (Schmuck and Runkel, 1972), including paraphrasing, checking, and describing behavior.

**Paraphrasing** is a way of checking with a person to assure that others understands his/her suggestion as he/she intended. It can avoid misunderstanding and cause unhappy emotion.

**Perception Checking** is way of checking with the speaker to assure the intended message. For example, group members should say “that is how I understand your feelings. Am I accurate?”

**Describing Behavior** requires group members to report specific observable behaviors of the other without making inference about the other’s person’s motives, attitude, and personality.
Recommendations for Further Research

The following studies are recommended for future research:

Evolutionary Problem-Solving

According to the analysis of the instruments, learning culture measure and the rational argumentation are testing the same things. In the future the researcher can combine two different concepts, rational argumentation and learning culture into a new term, "evolutionary problem-solving", to explore problem-solving in organizational level and how it influences decision-making quality and consensus. The value of this thinking helps to develop a new theoretical structure for human decision making.

Analysis of Instrument

Data from the present sample will be re-analyzed using reconstructed forms of the instruments both to strengthen the instruments and to test the hypotheses with more powerful measure.

The Measure of Learning Culture

Future research should develop a valid measure for Learning Culture so that the variable could be measured and its impact upon decision quality could be assessed.

In order to make sure of validity, a researcher could analyze the validity of the learning culture measure. Further, using a large sample, the factor analysis approach could be used to find "construct validity"
for the learning culture measure.

**Group Observation**

In the future, group observation as a substitute for a self-report survey might be used. In order to close the gap between the self report survey and actual group behavior, qualitative research can be applied to further explore this topic. An external evaluator would decrease the prejudice of self-preference. For example, the assessment of decision quality should consider ethics. A self-report survey makes it hard to understand the moral dimensions that impinge upon a group’s decision.

**Longitudinal Observation**

The instruments and hypotheses tested in this study should be validated through intensive, longitudinal observations with decision groups. Such qualitative research could add considerably to understanding the dynamic relationships between variables explored here and other influences on decision quality.

**The Assessment of Decision Quality**

Research should seek more powerful measures of decision quality and should assess the factors that influence participants' perceptions of quality. Present studies of decision quality suffer because surrogate measures are subject to many flaws.

Working groups should be studied to determine whether and how decisions are implemented and whether the variables discussed
in this study affect commitment and follow-through.

**Generalization**

In the future, a researcher might be able to obtain a sample more easily. A random sample could be used to make the study a stronger basis for generalization.

**Family Communication**

This study can be expanded to help a family find effective problem-solving and communication skills for the parents and children. Past experience indicates that parents and children do not communicate with each other very well. The parents in Taiwan, particularly fathers, usually utilize the authority of a traditional family structure to determine children's career, schools, and even marriage. Children are repressed in a family structure. On the other hand, the children, who are innocent, cannot realize the potential risks in the future. When innocent behavior and arbitrary authority prevail in the entire family, the climate of communication is poor and this hinders the growth of the family. In future research, families can be chosen as the sample and the principles of individual openness, rational argumentation, and learning culture can be studied as they apply to solve family problems.
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Appendix A
The Cover Letter of Pilot Study
February, 8, 93

Dear Board Member,

I am in the Department of Educational Policy and Leadership at the Ohio State University (OSU). I am planning to research group decision-making. Because you are a member of a group that makes important decision about education, your responses to the attached short questionnaire to this letter will help us understand factors that make group decision-making more effective. The results should be as useful as to your board to the broader study. Please mail them within the week to me in the enclosed envelop.

Please write any comments you wish to make in the margins or on the back of each questionnaire. I will send you the full results of the study and the results for your group. This study is closely related to “real life” and your work; therefore, the results may provide ways to make your work easier and more effective.

Thank you for taking time from your busy schedule to complete these questions. Your responses will help many groups become more effective in their decision-making.

Sincerely Yours;

Nai-Ying Whang
Researcher
Appendix B

Cover Letters For Survey
April 8, 1993

Dear School Decision-Maker,

You have been identified as a member of a group that makes decisions about education in your school. Because you are a member of a group that makes important decision about education, your responses to the attached short questionnaire to this letter will help us understand factors that make group decision-making more effective.

We are in the Department of Educational Policy and Leadership at the Ohio State University (OSU) and we are researching group decision-making. The results should be as useful as to your group as well as the broader study. This study is closely related to “real life” and your work; therefore, the results may provide ways to make your work easier and more effective.

Each questionnaire will be anonymous. We have asked you to name your school as we can return a summary of your group to you.

Please mail them within the week to me in the enclosed envelope. Please write any comments you wish to make in the margins or on the back of each questionnaire. We will send you the full results of the study and the results for your group.

Thank you for taking time from your busy schedule to complete these questions. Your responses will help many groups become more effective in their decision-making.

Sincerely Yours;

William W. Wayson  
Principal Investigator

Nai-Ying Whang  
Research Assistant
April 8, 1993

Dear ____________

Thank you for agreeing to help with our study of factors that contribute to better decision-making in school groups. We are enclosing

- enough questionnaires for all your team members,
- a cover letter for each, and a stamped, return envelope for each

Please distribute these to each of the team members and ask them to complete it within the week and return it in the envelope. Also complete one of the questionnaires yourself if you are a member of the decision-making group. Because we are dealing with a select sample of decision groups, every return is important. Please encourage your group to return the questionnaire so the data will be complete.

If you do not have enough questionnaires, please call or write us and we will send you the number you need.

Later in the Summer or early next Fall, we will send you a summary of the total findings in the study and a summary for your group. You should find it useful for reviewing your team’s process for making decisions.

We certainly appreciate your help.

Thank You,

William W. Wayson
Principal Investigator

Nai-Ying Whang
Researcher
Appendix C

Instruments
**Individual-Group Interaction**

Instruction: Please circle a number showing to what extent you believe the following items describe how you experience your work in the group.

<table>
<thead>
<tr>
<th>Items</th>
<th>Very Little</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In general, to what extent do you encourage others to challenge ideas?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2. In general, to what extent do others’ challenges help you improve ideas?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3. In general, to what extent are you willing to challenge others’ thinking during discussion?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4. In general, to what extent do you reflect upon your opinions to test whether they are well-founded?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5. In general, to what extent do other group members influence your thinking about the position you take on issues?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>6. In general, to what extent do the ideas expressed by others cause you to improve your own positions?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>7. In general, to what extent do you try to protect yourself when you state your opinions?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>8. In general, to what extent are you committed to tell the truth during discussion?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>9. In general, to what extent do you feel free from external constraints in this group?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>10. In general, to what extent do you feel free to ask why the problem exists and what its causes were?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>11. In general, to what extent do you hesitate to express your feelings about problems that are discussed in the group?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>12. In general, how open are you to express your ideas freely?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>13. In general, how much do you consider ideas that oppose your own?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>14. In general, to what extent do other group members express their feelings about problems that are discussed in the group?</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
### Rational Discussion

Instruction: Please circle a number showing to what extent you believe the following items describe your group’s general way of discussing controversial issues before making decisions.

<table>
<thead>
<tr>
<th>Items</th>
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<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In general, to what extent do group members offer logical arguments on controversial issues for improving problem-solving process?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>2. In general, to what extent are reasonable arguments exchanged among members to enhance the quality of the problem-solving process?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>3. In general, to what extent do group members challenge the assumptions underlying issues that surface during problem-solving discussions?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>4. In general, to what extent during group interactions do participants use logic to develop arguments and clarify opposing views?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>5. In general, to what extent do group members offer data as evidence to support their claims?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>6. In general, to what extent does the group engage in thorough discussion of all sides of controversial issues?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>7. In general, to what extent does this group encourage thorough discussion of differences of opinions?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>8. In general, to what extent does this group make decisions on the basis of information and reason?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>9. In general, to what extent do group members link data they offer with the claims they make?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>10. In general, to what extent do group members offer rational rebuttals to claims made or reasons offered by other members?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>11. In general, to what extent do group members define new terms they use during the problem-solving process?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>12. In general, to what extent do group members eliminate distortions and confusions introduced during problem-solving?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
</tbody>
</table>
Organizational Culture For Learning

Instruction: Please circle a number showing to what extent you believe the following items describe the culture in your school system.

<table>
<thead>
<tr>
<th>Items</th>
<th>Very Little</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To what extent does your organizational culture emphasize self-development?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>2. To what extent does your organizational culture emphasize continuous learning to solve organizational problems?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>3. To what extent does your organizational culture encourage employees to be candid in problem-solving?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>4. To what extent does your organizational culture encourage employees to practice what they preach?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>5. To what extent does your organizational culture support control from top management?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>6. To what extent does your organization make decisions based on the best interest of the organization?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>7. To what extent does your organization have a vision shared by all employees?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>8. To what extent does the organizational culture encourage decentralized decision-making?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
</tbody>
</table>
9. To what extent does your organization use the tension between where it wants to go and what people are currently doing to stimulate creative problem-solving?  

<table>
<thead>
<tr>
<th>Items</th>
<th>Very Little</th>
<th>Very Little</th>
<th>Very Much</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. To what extent does your organizational culture encourage innovation through collaborative team processes?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11. To what extent does your organizational culture encourage group members to share in dialogue and inquiry?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12. To what extent does your organizational culture encourage multiple perspectives during problem-solving sessions?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13. To what extent does your organization consider the interdependence of all components of the organization during problem-solving?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14. To what extent does your organization solve problems by going beyond symptoms to consider deeper causes?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
How Does Your Group Make Decisions?

Instruction: Please circle a number showing to what extent you believe the following items describe how your group makes decisions.

<table>
<thead>
<tr>
<th>Items</th>
<th>Very Little</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In general, to what extent does your group thoroughly canvass a wide range of alternative courses of action before making a decision?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>2. In general, to what extent does your group survey the full range of objectives to be fulfilled by a decision?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>3. In general, to what extent does your group survey the full range of values implied by a decision?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>4. In general, to what extent does your group weigh the costs or drawbacks of each alternative before choosing one?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>5. In general, to what extent does your group intensively search for new information about alternatives before making a decision?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>6. In general, to what extent does your group take account of any new information they receive, even when the information or judgment does not support the course of action they would prefer to take?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>7. In general, to what extent does your group reexamine positive and negative consequences of all known alternative before choosing one?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>8. In general, to what extent does your group make detailed provisions for implementing a chosen course of action?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>9. In general, how effective are the decisions your group makes?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>10. Overall, how satisfied are you with the decisions your group makes?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
</tbody>
</table>
Making Decisions

Instruction: Please circle a number showing to what extent you believe the following items describe your group’s general way of making decisions.

<table>
<thead>
<tr>
<th>Items</th>
<th>Very Little</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In general, to what extent do you agree with the decisions of the group?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>2. In general, to what extent are you willing to cooperate with the group to implement decisions?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>3. In general, to what extent is there enough information available to make a sound decision?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>4. In general, to what extent is the information fully understood by the group to make a decision?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>5. In general, to what extent is information fully used by the group to make a decision?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>6. In general, to what extent do you feel that the group accepts you?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>7. In general, to what extent do you have a sense of identity with the group?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>8. In general, to what extent do you want to continue working with this group?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>9. In general, to what extent does the group achieve consensus on decisions?</td>
<td>1 2 3 4</td>
<td></td>
</tr>
</tbody>
</table>

Thank You!
Return To:
William W. Wayson
or Nai-Ying Whang
301 Ramseyer Hall
29 W. Woodruff Ave.,
Columbus, Ohio 43210
Appendix D
Cover Letter and Follow Up Correspondence
May 5, 1993

Dear School Decision-Maker:

About ten days ago you received questionnaires on which you could rate how your team make decisions. We’ve heard from some of you that just reading it helped you understand how a group can function better. After we’ve received more responses, we will give you information that should help you know more about your team’s decision-making.

This letter is to THANK everyone who has responded already, and encourage others to RETURN the questionnaire if they have not yet done so.

Since the study is to assess how team characteristics affect decision-making, EVERY MEMBERS’ response is important. Since we have asked only a few teams, we must hear from all teams; so, your response is important.

We know it is a busy time, but we hope you will complete the questionnaire and return it to us before May 17. You will help us help teams like yours.

Sincerely Yours;

William Wayson
Principal Investigator

Nai-Ying Whang
Researcher
Appendix E
Summary of Standard Deviation
Table 11

Summary Table of Group Standard Deviation for IO, RA
Sum of RA and LC, DMQ, and CO

<table>
<thead>
<tr>
<th>Group</th>
<th>IO</th>
<th>RA</th>
<th>LC</th>
<th>DMQ</th>
<th>CO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8.2</td>
<td>7.4</td>
<td>20.6</td>
<td>1.22</td>
<td>4.9</td>
</tr>
<tr>
<td>2</td>
<td>4.6</td>
<td>9.9</td>
<td>15.8</td>
<td>1.38</td>
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<td>4.2</td>
<td>8.1</td>
<td>16.2</td>
<td>1.0</td>
<td>5.2</td>
</tr>
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<td>4</td>
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<td>1.2</td>
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<td>1.5</td>
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<td>7.1</td>
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<td>3.5</td>
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<td>1.7</td>
<td>5.6</td>
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<td>5.7</td>
<td>15.3</td>
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<td>1.2</td>
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</table>
Table 11 (Continued,)

Mean Scores

<table>
<thead>
<tr>
<th>Group</th>
<th>IO</th>
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<th>LC</th>
<th>DMQ</th>
<th>CO</th>
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<td>17</td>
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</table>
Appendix F
Data of Instruments
<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Minimum</th>
<th>Maximum</th>
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Number=Item QA=Individual Openness, QB=Rational Argumentation, QC=Learning Culture, QD=Decision Quality, QE=Consensus

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