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Proposal of a Dual System Model for the Consensus Building Process in the Problem Formulation Process in Groups

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Abstract

This paper introduces a model incorporating consensus building into group problem-sharing processes, addressing the challenges of problem setting in groups. In today's complex world, distinguishing and defining problems are particularly challenging for groups, due to subjective perceptions and differing personal views that lead to incompatible perceptions. According to Imayoshi et al., problems are inherently subjective. BEAR et al. suggest that the difficulty in problem setting is influenced by heterogeneous information, objectives, and cognitive structures, acting as barriers to effective problem recognition. This model aims to identify these inhibitors and elucidate the complexities involved in collective problem setting, highlighting the need for alignment and appropriate consensus within diverse groups.

Keywords: problem formulating, problem formulating process model in a group, consensus

1 Introduction

This paper proposes a model that incorporates the perspective of consensus building in the process of problem sharing in groups, aiming to clarify the causes of difficulties in problem setting within groups. In modern society, we face various challenges. Some issues are simple and trivial, manageable by individuals alone, while others are complex and large-scale, requiring collective efforts. Especially in today's rapidly changing and increasingly uncertain world, the latter type of problems is becoming more prevalent.

However, in such complex situations, correctly recognizing and defining problems is not straightforward. It is challenging enough for individuals to accurately perceive problems, and even more so for groups. According to Imayoshi et al. [1], a problem arises when the owner of the problem subjectively perceives dissatisfaction with a system within the real world, suggesting that problems are inherently subjective. When multiple individuals share what they subjectively perceive as a problem, the differing personal views within the group can lead to incompatible perceptions. During the process where each person aligns their views based on what they individually believe to be correct, or when such alignment fails, it can be challenging to establish a common problem as a group. Additionally, seeking appropriateness and correctness in this alignment process adds further complexity compared to individual problem setting.

BEAR et al. [2] attribute the difficulty in correctly setting problems in groups to factors such as heterogeneous information sets, heterogeneous objectives, and heterogeneous cognitive

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structures, as suggested by Simon et al. [3] [4]. These factors act as barriers to problem recognition within groups.

Thus, this paper describes the process of problem recognition in groups using a descriptive model and, based on this model, explores the factors contributing to the inhibitors identified by BEAR et al. The study aims to elucidate the causes of difficulties in problem setting within groups.

2 Previous Study

2.1 Introduction to "Microfoundations of strategic problem formulation"

Baer et al. explored how strategic issues are structured within teams with varied backgrounds in the business sector [2]. They pinpointed obstacles to effectively defining strategic problems in these teams and offered strategies for enhancement.

Initially, Baer et al. view the process of formulating problems within groups as a joint effort to refine initial ambiguous problem indications into clearer, actionable problem statements by identifying underlying causes. This process involves two intertwined tasks: first, determining interconnected patterns among all indicators stemming from the initial symptom, and second, developing explanations for one or more of these indicators.

Furthermore, they introduce the concept of "comprehensiveness" as a measure for evaluating the efficacy of problem formulation activities. Comprehensiveness measures the ability to generate multiple relevant problem statements from a single or set of initial symptoms. The greater the number of alternative problem statements generated, the more comprehensive the problem formulation is considered.

Baer et al. emphasize the importance of diverse team composition in addressing complex strategic issues. They note that while diverse teams can bring a breadth of perspectives, utilizing this diversity effectively is challenging due to what Simon refers to as "bounded rationality." This concept suggests that limitations in human cognition can prevent the full utilization of available information, thereby impacting the comprehensiveness of problem formulation.

Moreover, Baer et al. discuss the impact of cognitive diversity within teams. While diverse cognitive perspectives can enhance problem understanding, reconciling these different viewpoints can be resource-intensive and may detract from effective problem formulation.

Additionally, they address how differing objectives among team members can affect problem formulation. While diversity in goals can enrich the formulation process, it can also lead to internal politics that may restrict the scope of problem exploration. Such political maneuvers typically aim to advance individual or subgroup interests, potentially detracting from the group's overall objective.

In conclusion, Baer and his team illustrate that formulating problems within groups is a complex process influenced by a multitude of factors, more so than when problems are formulated individually.

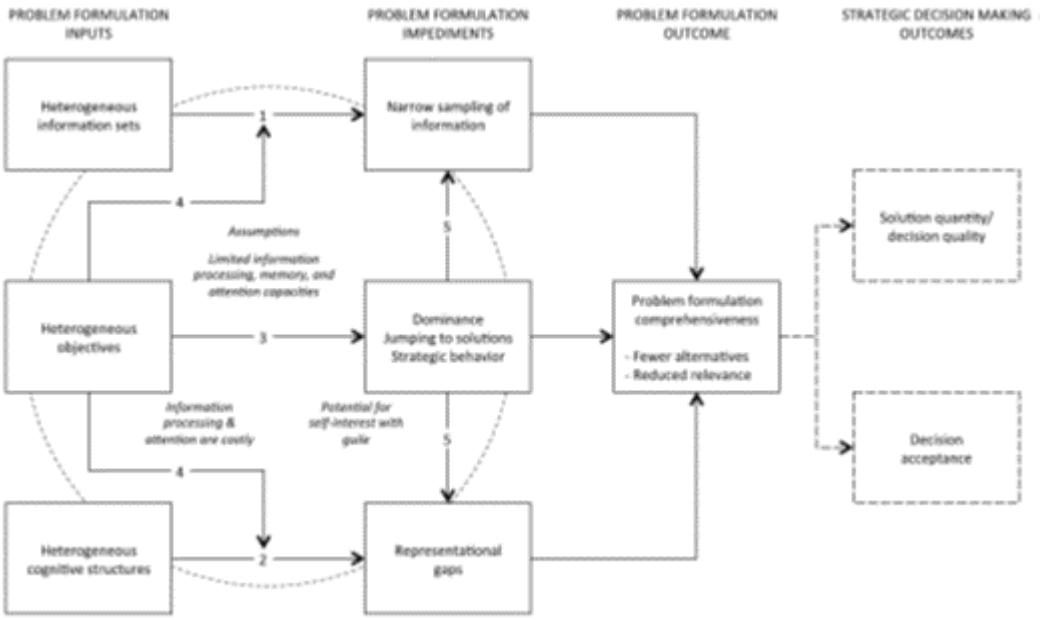

Figure 1: Model of strategic problem formulation

2.2 Descriptive Model of Group Problem Formation

Based on the review of previous research, we have been developing descriptive model of group problem formation.

In the model proposed by Imayoshi et al., an individual perceives a symptom (or group of symptoms) as part of a system, identifying it as a problem when their dissatisfaction with the system surpasses a personal threshold [1]. Following this concept, the authors have delineated the process from problem formulation to resolution for individuals by creating a flowchart that illustrates the stages of problem recognition, resolution, and reevaluation when dissatisfaction persists. However, this model primarily depicts an individual's problem perception and is not directly transferable to group problem recognition. It will be necessary to adapt this model to better reflect the dynamics of group problem formulation.

The model by Baer et al., which describes problem formation in groups, acknowledges both the benefits and challenges that arise from a group's diversity [2]. Thus, while it captures the dynamics of group problem formulation similarly to Imayoshi et al.'s individual model, it does not fully elucidate the processes leading to problem formulation in groups. By clarifying theseprocesses, it may be possible to understand how the diversity-related disincentives identified by Baer et al. occur, and to foresee further research aimed at addressing these issues.

Consequently, we proposed a descriptive model using a flowchart that clarifies the process of problem formulation in groups, aiming to build upon the findings of previous studies as shown in Figure 2 [5]. Drawing from the foundational insights on problem recognition discussed earlier, we introduce a flowchart-based descriptive model depicted in Figure 2, which outlines how individual perceptions of a problem converge to form a collective understanding within a group. This model is structured into three distinct stages:

（The individual) problem recognition phase: This initial phase involves each member of the group individually identifying and interpreting symptoms within their unique framework. This process aligns with traditional methods of individual problem recognition as noted in earlier research.

（The group) problem sharing phase: This subsequent phase transitions the individually recognized problems into a shared group context. For a problem initially recognized by an individual to evolve into a collective issue, it must be articulated in a manner comprehensible and relatable to all group members. During this stage, every group member reinterprets the individually recognized problems, attempting to integrate them into a collective problem framework that aligns with the group's understanding and perspectives. This process is essential for establishing a common ground from which the group can address the problem collectively.

Every group member assimilates another individual's problem recognition system into their own, crafting a revised system of understanding the problem. Some members might adopt another's system without alteration, leading to a similar problem formulation. Others might merge elements from various systems to create different problem formulations. Additionally, some may integrate systems from others yet maintain their original perception of the problem. Ultimately, each group member integrates at least one other person's view into their own, altering their own conceptual framework and degree of dissatisfaction. This integration process may lead some members to identify the collective system formulated by the group as the problem.

（The group) problem agreement phase involves the collective decision-making process to determine if the jointly identified issue should be officially recognized as a group problem. During the group problem sharing phase, it was noted that not all members might align in their views of the problem. In response, a formal consensus-building process is undertaken to officially classify the issue as a concern for the group. Several approaches can be utilized to reach this decision, including unanimous agreement, majority rule, or a decision made by a designated leader. Through this process of consensus building, the issue may be accepted as a group problem. If a consensus cannot be achieved, then the issue remains recognized at the individual level and does not ascend to the status of a group problem.

2.3 Consensus Building in Group Problem Formation

In the field of group problem formation as reviewed in prior research, the existence of multiple stakeholders necessitates reaching a consensus on the problem setting in order to collaboratively address it. The definition of consensus building varies among researchers but generally converges on the idea that various parties, including stakeholders, aim to align their opinions on the content and implementation of the initiative. Here, Suskind has stated [6]:

- Consensus building is a process of seeking unanimous agreement. It involves a good-faith effort to meet the interests of all stakeholders.
- Consensus has been reached when everyone agrees they can live with whatever is proposed after every effort has been made to meet the interests of all stakeholding parties.

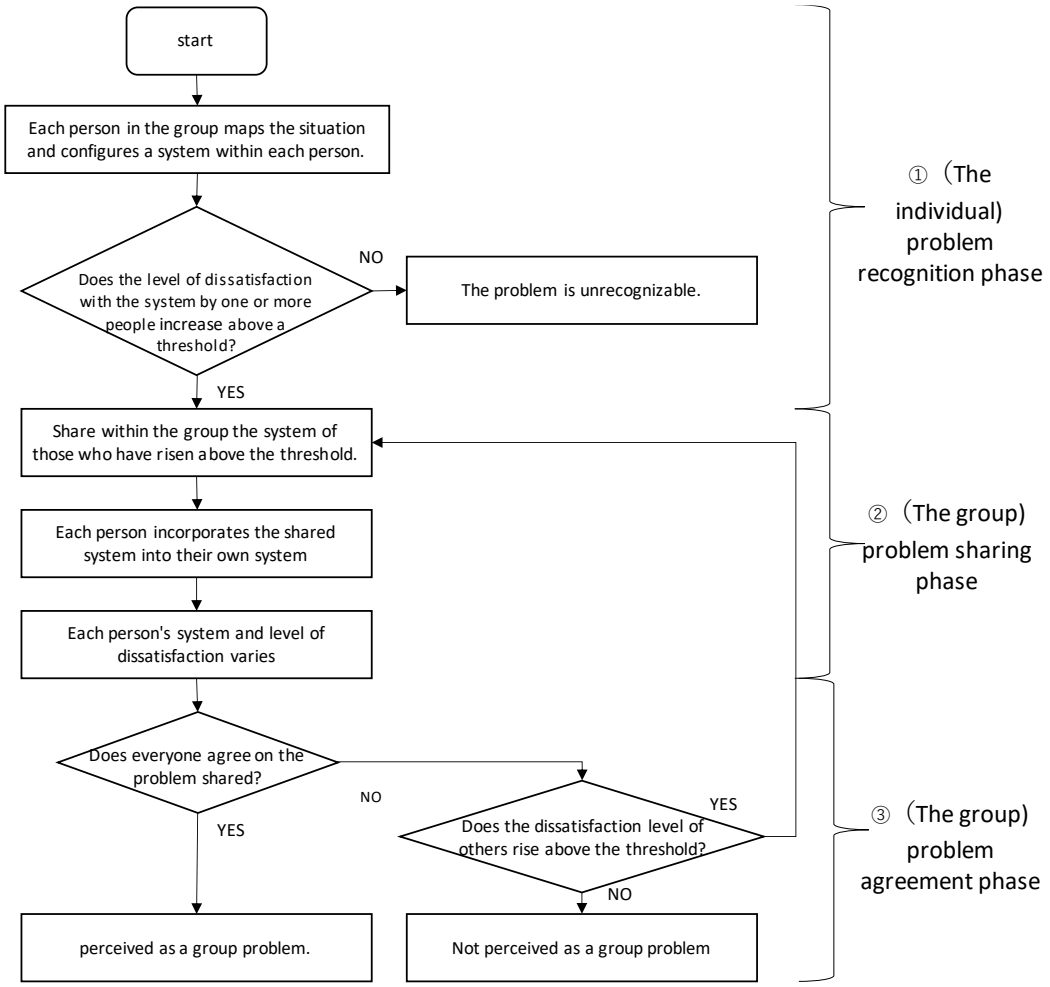

Figure 2: Problem formulation process models in groups

Adopting the definitions of "Consensus building" and "Consensus," Inohara points out that "consensus" is a state of the group, whereas "consensus building" is seen as a process. The following discussion reviews Inohara's thoughts on consensus and the relationship between consensus and consensus building [7].

Inohara, citing Straus, says: A group reaches consensus on a decision when every member can agree to support that decision. Each person may not think it's the very best decision, but he or she can buy into it and actively support its implementation. No one in the group feels that his or her fundamental interests have been compromised. Consensus is not "almost everybody." It's unanimous support for a decision, in the same way that a jury returns a unanimous verdict. (Straus, 2002. p.58)

In comparing this with Suskind's definition, Inohara identifies common elements such as "agree," "unanimous," and "interests" as crucial. Additionally, both authors highlight the importance of acceptance with terms such as "live with" and "buy into." From this, Inohara suggests that consensus involves tolerating and accepting proposals that may not be the most desirable.

Furthermore, Inohara comments on the differences between "Consensus" and "agree," noting that "agree" reflects an individual's state, while "Consensus" represents a collective state. Particularly, when all individuals in a group "agree" on a matter, it is considered that the group has reached a "Consensus."

3 Proposal of a System Model for the Problem Sharing process

3.1 Implications from Previous Studies

Building on the survey of prior research discussed in the previous section, this section examines the process of problem sharing in groups and proposes a model incorporating the perspective of consensus building for problem formulation.

Firstly, our reliance on the problem setting model by Imayoshi et al. in the individual problem formulation process involves the individual recognizing a problem when they map a real-world situation as a system and their dissatisfaction with that system exceeds a certain threshold [1].

Expanding this model to the group problem formulation process, our model considers a scenario where a problem is established if everyone's dissatisfaction exceeds the threshold when the proposed problem's system is mapped. Based on the definition of agreement from prior studies, consensus in a group problem occurs when dissatisfaction with the shared system surpasses the threshold. Similarly, a situation where there is consensus on a group problem implies that all group members agree on the problem, characterized by everyone's dissatisfaction with the shared system exceeding the threshold. This leads to a cycle of problem sharing phases and agreement phases until all members' dissatisfaction reaches beyond the threshold, which constitutes the consensus-building process in group problem formulation.

3.2 Descriptive model for the problem-sharing process of problem formulation

This model consists of a group of two or more members, each subjectively perceiving and mapping signs of problems within the real-world scenario W as system s_i. An issue is recognized individually when the dissatisfaction with the system s_i exceeds a threshold θ_i. In the figure, the group is schematically represented with the minimum of two members, where ● represents signs of problems that all group members can recognize, while ▲ and ✕ represent signs that only some members can recognize. Subsequently, for problems that need to be addressed as a group, the individually recognized problems s_i are shared as the group problem P. Each member then remaps the presented problem P internally, altering the form of their recognized system s_i. In this way, all members repetitively share the mapping of the situation O and the problem P, as well as their perceived system s_i. When the dissatisfaction Di of all members exceeds θ_i, it can be said that all members agree on the problem, consensus has been reached, and the problem setting as a group is established.

In this model, based on the ideas of Tabata et al. [8], mapping from the real world is also considered a system, as well as expressing it externally to share within the group. Furthermore, sharing the system P as a problem involves sharing the method of systematizing the signs of problems in situation O. Moreover, situation O itself, independent of the consensus-building process among the members, continuously changes within the real world W, and it is thought that changes in the signs of problems can occur due to influences outside the consensus-building process.

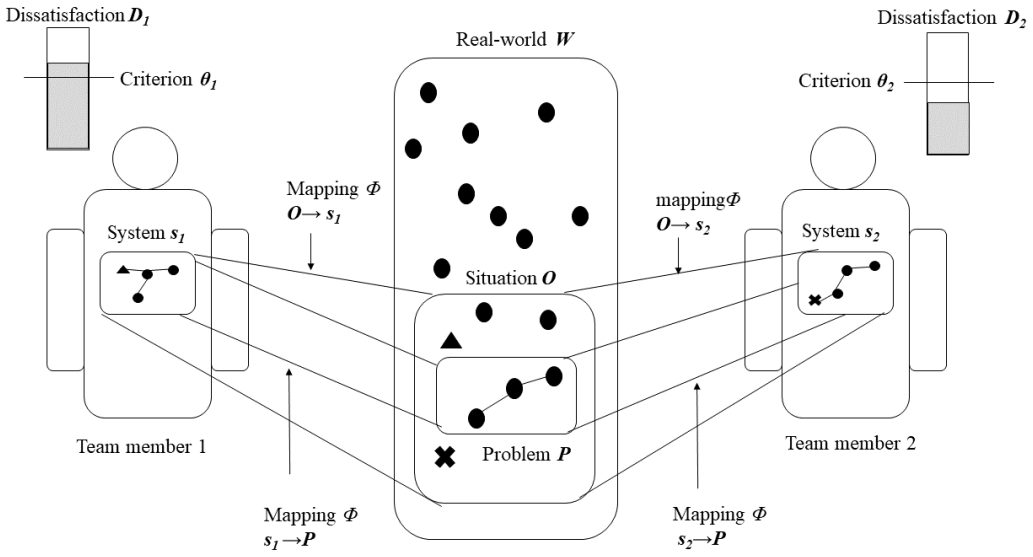

Figure 3: Descriptive model for the problem-sharing process of problem formulation

4 Discussion

In this section, we explore how the inhibitors identified by BEAR et al. arise, using the model proposed in this study.

Firstly, let's consider the heterogeneous information sets. When each member of the group maps the system si from situation O, they interpret and map the signs of problems within the situation through their personal subjectivity. Even though all members are observing the same situation O, the signs of problems they perceive differ due to their subjective views, resulting in information discrepancies among them. This diversity in perceived information among the group members can be represented as the factor of heterogeneous information sets as described by BEAR et al.

Next, we examine how heterogeneous objectives affect the process. The sharing process from individual systems si to the collective problem P is also based on each member's subjective interpretation. Members may express the systems they recognize in ways that suit their personal objectives, leading some to represent their perceived systems si straightforwardly for the benefit of the group, while others may choose to represent their systems in a different form to avoid personal disadvantage.

Furthermore, heterogeneous cognitive structures indicate that the mapping process from O to si varies among the group members, which affects how the signs of problems are linked as a system. This suggests that even if members capture the exact same signs of a problem, the way they connect these signs can differ from one member to another. This variance in cognitive structuring among individuals illustrates the complexity in achieving a unified understanding and response within a diverse group.

5 Limitations and Issues of This Study

From the previous discussions, we have attempted to express the shared process of problem recognition in problem setting in groups in a descriptive model. From the previous studies, we found its characteristics and realized the construction of one conceptual model. However, this model is only a construction based on previous studies and has not been proven. Based on this model, it is necessary to validate it with people who work on actual problem setting.

6 Conclusion and Future Work

In conclusion, our model of the problem-setting process within groups, expressed in a system-shared format, offers significant insights into the dynamics of collective decision-making. While the model demonstrates practical limitations in empirical verification, it provides a robust framework for understanding and explaining the inhibitors of group problem formulation as outlined by BEAR et al.

Our model effectively articulates how heterogeneous information sets, objectives, and cognitive structures can hinder consensus and coherent problem recognition within groups. These traditional inhibitors are well-captured, allowing for a deeper understanding of the barriers that groups face when attempting to unify around a single problem definition.

Moreover, the structure of our model also opens avenues for identifying new inhibitory factors that may not have been previously recognized. By dissecting the stages of problem recognition and formulation through a systematic lens, our model allows for the observation and analysis of subtle dynamics that might contribute to further inefficiencies in group problem-solving processes.

Thus, this research not only corroborates the findings of previous studies but also enhances our comprehension of group problem formulation by highlighting potential areas for further investigation and intervention. This could ultimately lead to more effective strategies for managing group dynamics and improving the decision-making processes within diverse teams.

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