

G-SEC WORKING PAPER No.7

Techniques for Raising the Intellectual Productivity of Meetings — Preliminary considerations focusing on utterances and their linkage —

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April, 2006

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Meetings fulfill an important function in corporate management, and how to raise the intellectual productivity of meetings is a critical factor. At the same time, though, the intellectual productivity of meetings is difficult to ascertain, and for this reason more devices are needed in the methods of running meetings. Previous research by the authors has detected at experimental meetings the “inconclusive transition” phenomenon in which discussion on a given topic will shift to the next topic without reaching a certain agreement as a factor affecting the level of intellectual productivity. Providing a theoretical base to this discovery, this paper gives preliminary consideration for developing techniques for raising the intellectual productivity of meetings. First, to explore techniques that can focus on utterances and their linkage, we give theoretical consideration to how people perceive this. Next we establish working hypotheses regarding methods of raising meeting productivity. Lastly, we view a video recording of actual meetings to test the working hypotheses, and prepare for empirical research.

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— Preliminary considerations focusing on utterances and their linkage —

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Meetings fulfill an important function in corporate management, and how to raise the intellectual productivity of meetings is a critical factor. At the same time, though, the intellectual productivity of meetings is difficult to ascertain, and for this reason more devices are needed in the methods of running meetings. Previous research by the authors has detected at experimental meetings the “inconclusive transition” phenomenon in which discussion on a given topic will shift to the next topic without reaching a certain agreement as a factor affecting the level of intellectual productivity. Providing a theoretical base to this discovery, this paper gives preliminary consideration for developing techniques for raising the intellectual productivity of meetings. First, to explore techniques that can focus on utterances and their linkage, we give theoretical consideration to how people perceive this. Next we establish working hypotheses regarding methods of raising meeting productivity. Lastly, we view a video recording of actual meetings to test the working hypotheses, and prepare for empirical research.

1. Improving intellectual productivity of meetings and the aims of this paper

Meetings fulfill an important function in corporate management. As information is shared among participants, more information is created, and decisions are made. It goes without saying that the value of meetings depends on the level of the intellectual productivity.

Meetings are held with the hope that decision making will be better if participants exchange their respective views and creatively stimulate each other rather than have one person consider the issue and make a decision. Certainly, there are conclusions reached at meetings that nobody had envisaged before the meeting and that cannot be reduced back to the thoughts or opinions of individual participants. If such conclusions can be achieved, we can say the meeting where they are achieved is creative.

Of course, not all meetings have a creative aim; some are held simply to communicate information, or to ensure that participants are fully conversant with the issues. Typical of these are meetings for advising participants of their respective roles in already determined policies or plans, and meetings that enable participants to confirm each other's awareness of the issues. Or meetings in which colleagues whose work commitments make it hard to communicate with each other on a routine basis set a time to sit down together and discuss various issues. Besides these, meetings are held for any number of diverse reasons and aims.

This paper focuses on meetings aimed at producing a creative conclusion, and these we will call creative meetings. This kind of meeting requires a high level of intellectual activity from the participants, and productivity is critical. At the same time, though, the intellectual productivity of meetings is difficult to ascertain, and for this reason more devices are needed in the methods of running meetings.

Here we will look at research to date broadly relating to decision-making. This research can be classified into the following four categories: 1) research regarding the centralization and decentralization of decision-making; 2) research regarding the setting of formal and informal decision-making procedures; 3) research regarding the quantity and quality of and ease of access to information essential for decision-making; and 4) research regarding conflicts in decision-making. Of these, 4) is connected with the nature of meetings, and its essence is research dealing with the emergence of bias in collective decision-making. Representative of this is research into "groupthink", in which the meeting becomes fixed in a specific direction if it is overly conscious about reaching a consensus (Janis, 1972), and research into the rise of political posturing over conclusions reached (Child, 1972). This research provides definite guidelines on the nature of meetings in the sense of how to avoid bias.

There is, however, a scarcity of research that gives an insight into how to proceed with meetings aimed at decision-making in a positive sense. In this light, Takagi (1994) stands out. This research directly considers intellectual productivity at meetings focusing on the utterances exchanged

and their linkage. A particularly important point is the detection at experimental meetings of the “inconclusive transition” phenomenon in which discussion on a given topic will shift to the next topic without reaching a certain agreement as a factor affecting the level of intellectual productivity. That is, a tendency could be seen in which the higher the number of inconclusive transitions in a meeting, the lower the intellectual productivity, and vice versa. Certainly, meetings that move on to the next topic leaving the previous topic ambiguous without adequate discussion cannot hope to reach top-quality conclusions. Therefore employing some form of technique to prevent the uncontrolled emergence of inconclusive transitions can contribute to raising the intellectual productivity of meetings. In other words, it is worth examining the effect of techniques to prevent the shift to a new topic without a cohesive settlement of the utterances by the meeting participants on the previous topic.

The aim of this paper is to provide a theoretical base to this discovery, and give preliminary consideration for developing techniques for raising the intellectual productivity of meetings. The discussion will proceed in the following order. First, to explore techniques that can focus on utterances and their linkage, we give theoretical consideration to how people perceive this. Next we establish working hypotheses regarding methods of raising meeting productivity. Lastly, we view a video recording of actual meetings to test the working hypotheses, and prepare for empirical research.

2. Distributed cognitions in meetings

Why do several people discuss an issue with each other and make a decision rather than one person alone consider the issue and decide? Meetings are held at least on the premise that several people can reach a better decision than one person deciding alone. There are limits to the extent of knowledge that any one person has, and also to cognitive capacity. It is because of the potential to supplement and extend the limited capacity of a single person that cooperative work, i.e. a meeting, is conducted.

Certainly from our everyday experiences we can often gain completely new perspectives and discover clues for solving problems by discussing things with other people. As we exchange words, we can at times acquire a fresh perception completely different from the one we had before engaging in the conversation. This is the perception that something new has been generated within the conversation, rather than a sense that one of the conversation participants is directing or instructing the other participants.

Why, then, can we have such an experience? We will look at this on the basis of the theory known as distributed cognition. First, to briefly summarize the concept of cognition, it is a higher brain function. It is a process of reasoning, judgment and memory. Since it is a brain activity, it is a process consummated within the individual. So whether an individual can make a superior decision

will depend on the capabilities and endeavors of that individual. Naturally character, capability and perspective differ from person to person. Some can perform a given task well, while others cannot. Some are sharper than others in analyzing an issue, and some have outstanding powers of memory.

Many people use calculators when working with numbers. Or they work out calculations on paper. Such calculation methods are actions of substituting a part of one's own brain function with a machine, i.e. the calculator, or paper. This reduces the load on the brain cognition by substituting a part of it. This is true not just in calculation, but when we prepare a document, word processing software on the computer is a substitute for cognition. That is, even if we do not remember every single letter of every word, the word processing software is a substitute for this memory.

Cognition resources are not just machines, paper or software; people other than oneself are also resources. As has already pointed out, ideas not previously thought of among conversation participants can be generated in the course of the conversation, and this is an example of others being a cognition resource. In this way, utilizing the surrounding environment for cognition is referred to as distributed cognition (Salomon, 1993).

Here we will give slightly more consideration regarding distributed cognition focusing on meetings.¹ First, all participants in a conversation bring to it their own different knowledge and capability, so they are all able to make use of the knowledge and capabilities of other participants that they as individuals do not have. That is, they can supplement their cognition. What we need to note here is that having information about the knowledge and capabilities that the others possess is a condition for being able to supplement cognition. Another condition is an accurate understanding of what knowledge and capabilities are necessary regarding the issues being discussed.

Distributed cognition is not just mutually supplementing knowledge. There is much guided stimulation - or better, qualitative scaffolding, whereby one partner activates, provides meaning to , and possibly directs the cognitive activity of the other and thereby qualitatively changes the activity.²

In a sense, cognition is supplemented at a quantitative dimension. People bring together their knowledge and capabilities in an effort to enrich the knowledge and capabilities they believe they are lacking, and through this, improve their decision-making and problem-solving. So while the quantity of knowledge and capability brought to the discussion increases, this does not necessarily mean that the quality of the knowledge or capability itself changes. If five people participate in a discussion, the knowledge that can be shared by all will only ever be those five people's worth of knowledge. It will never be more than that.

In contrast, another possibility for distributed cognition is that the knowledge structure or capability itself can be qualitatively changed. Stimulating each other to enhance the perspective of

¹ Discussion on the characteristics of distributed cognition is based on Chapter 4 of Salomon (1993).

² Salomon (1993) p.133.

others or, conversely, urging others to change their perspective is not simply quantitatively supplementing knowledge, but is actively giving rise to new perspectives.

In any event, through the joint intellectual activity of distributed cognition, people can resolve problems and engage in creative activities that would be beyond the scope of one person acting alone.

Distributed cognition, though, is not all positive. Supplementing cognition is to substitute a part of one's own intellectual activity, and this may result in a decline in specific capability. For example, people who have become used to preparing documents on computer word processing software could experience difficulty in spelling some words when actually writing by hand. This is because they have become dependent on the automatic correction or spell checking function of the software. On the other hand, in distributed cognition that accompanies a qualitative transformation, that qualitative transformation is not always for the better. When there is intense pressure within a meeting to reach a consensus, the groupthink phenomenon mentioned earlier will rise to the surface. In this phenomenon, there is no effort to develop the perspective of the individual, instead, the conversation proceeds in a way that suppresses each person's diversity and creativity. Individuals are pressed to change their utterances and perspectives to a specific direction.

What, then, are the conditions necessary for invigorating creative meetings focused on in this paper? In the next chapter we will use the distributed cognition we have discussed to date as a lead in examining this.

3. Meeting creativity and self-organization

Kariyazono et al. (2001) researched cooperative problem-solving behavior based on the framework of distributed cognition. In the research, university students were picked as test subjects, and four groups were formed each with five members. They were given fragmentary information, and instructed to cooperate to solve a problem. Naturally, they exchanged their respective views in the process of solving the problem. This was an experiment in solving a problem with the group members at times coming into conflict over interpretation of the given information. This is basically the same as what this paper has called a creative meeting. While it was an experiment and information was controlled, to the subjects, this was an exercise in making a decision or solving a problem premised on the given information, regardless of whether that information was controlled or not. This is because at general meetings, not all information necessary for decision-making is available, and people make decisions based on judgments and inferences formed from the limited information.

An important point indicated by the research by Kariyazono et al. (2001) is a "common understanding" among participants. Common understanding is the condition of sharing the same level of understanding, the same knowledge, and the same interpretation regarding the information. It points

out that without this common understanding, the conversation loses direction. That is, utterances become ad hoc. Participants merely speak based on their own interpretation of the information they each possess, and if the phenomenon in which the understanding and acceptance of other participants cannot be gained continues, it becomes impossible to maintain the cohesion of the conversation, and, in turn, the meeting.

The research also highlighted that interaction increases when a common understanding is formed. As other participants give meaning to an utterance or clarify its standing within the meeting and this process is repeated, rules (how utterances are to proceed, the context) will be created for the meeting. Rather than one person setting meeting rules, the repeated actions of participants taking in each other's utterances and affording value to those utterances give direction to how the meeting proceeds.

Once meeting rules have been formed, interaction among participants increases. When utterances are made based on certain knowledge and information, other participants assess the utterances, or compare them with their own ideas. And participants are able to find out the knowledge and perspective of the other participants. They also become aware of the kind of information needed to resolve issues that are currently relevant, and this will encourage the utterances of other participants.

Research by Kariyazono et al. (2001) dealt with the formation of common understanding and meeting rules, but the research that addressed this from the perspective of self-organization is Takagi (1994) introduced earlier. It points out the following regarding the connection between the self-organization of meetings on the one hand and an increase of intellectual productivity and meeting creativity on the other from observations of experimental meetings.

“Meeting participants constantly seek to change discussion formats that prescribe the manner of their own activities, and conduct new discussions with a different format. If this self-organization functions toward raising the intellectual productivity of the meeting, new perspectives and ideas in the true sense will be generated. If, conversely, it functions toward lowering intellectual productivity, the meeting will end in a state of confusion with nothing remaining but muddled perspectives and fragmented ideas. As for whether self-organization is creative or not, in both cases something is generated so it is creative. But for intellectual productivity, the former mode of self-organization must be realized.

Self-organization of a meeting is manifest in discussion on how debate will proceed, and forms a linkage of context topics. To achieve a truly creative meeting, participants at all times need to properly recognize the discussion context, that is, the context topic of what is to be discussed and how, and renew this through adjustment and modification. Sharing context by way of a new angle or different perspective gained from this among participants, and through this, discussing and linking

new content topics will lead to the creation of the necessary new ideas. If self-organization manifests in this direction, the intellectual productivity of the meeting will improve.”³

Research by Takagi (1994) points out that the intellectual productivity of a meeting is higher when the level of inconclusive transition is zero or low, that is, when self-organization proceeds with a proper recognition of the context topic (i.e., topic relating to the meeting format) with no confusion.

This does not mean that self-organization takes a predetermined direction. As mentioned above, Takagi (1994) points this out in the fact that context topics change as they are adjusted. Similarly, Kariyazono et al. (2001) points out that the kind of information that is focused on in the discussion is determined extemporaneously according to the situation at that time.

What we should note here, though, is that all participants must understand the continually changing context within the meeting, and be conscious of this in their thinking and utterances. Failure in this respect will give rise to inconclusive transition, resulting in confused meeting self-organization that generates no creativity.

4. Self-organization conditions that can raise intellectual productivity

If participants in a meeting can maintain productive self-organization in the form of speaking with an understanding of meeting format and any changes to it, they should be able to raise the intellectual productivity of the meeting. That is, it is worth focusing on inconclusive transition in the sense of preventing non-productive self-organization in which the meeting format is confused. This is because the fewer times topics are changed while remaining inconclusive, the deeper the discussion becomes, increasing the possibility of generating new discoveries and perspectives from there. As already pointed out in 3., from the framework of distributed cognition, it becomes possible to induce utterances from each other, or modify the knowledge structure from a new viewpoint with the utterances of others as a steppingstone.

In this chapter, we will establish working hypotheses regarding factors for maintaining productive self-organization in meetings, and confirm the working hypotheses through observation experiments in the next chapter.

When viewing meetings as a scene of distributed cognition, what is first essential is conviction among the participants that their collaboration will generate creative results.

If intellectual activity is premised as an activity of the individual and consummated within the individual, the concern of the participants from the beginning to the end of the meeting is whether their utterances are accepted by others, or not. Here, concern is given only to whether information and knowledge will move from the speaker to the listener, rather than to the notion that something new

³ Takagi (1994) p.57.

will be generated through the mutual exchange of opinions. When people who embrace such a premise participate in a meeting, they spend more time on inward reflection than on responding with interest to the utterances of other participants (e.g., listen and be convinced, or present a counter argument).

On the other hand, if the meeting is premised on the mutual sharing of as many viewpoints and perspectives or as much information as possible, participants will most likely to engage in active discussion.

Conditions for meetings to be productively self-organized:

[1] Participants have a common understanding that intellectual activity (cognition) will be creative through collaboration.

There may be a meeting that gives priority only to novelty in an effort to present many viewpoints and perspectives or much information, possibly resulting in utterances that are out of context or that completely disregard timing. Feedback on these utterances can hardly be expected from other participants. Feedback is an action that gives value to an utterance. Value, however, is something that is not given beforehand. It forms gradually with the linkage of utterances, and becomes the standard for judging whether the utterances contribute to resolving the issues that are the theme of the meeting. But there is no way of knowing beforehand what kind of information or knowledge will be useful in problem solving. So there is a need to judge the situation and set judgment standards from moment to moment during the meeting. If, though, uniformity of judgment standards is overemphasized, there is a risk that establishing and agreeing on judgment standards will become the focus, and problem solving — the primary aim of the meeting — will diverge from the topic core. For example, if undue focus is given to the framework under which discussion is to proceed, the discussion may not advance, and this is considered to be a phenomenon caused by a preoccupation with the coherence of judgment standards or formal logic.

[2-1] Formulate standards for giving value to the utterances of others.

[2-2] Value standards are changed according to the situation.

[3] Speak in accordance with the context that arouses in the course of carrying out 2.

The context in a meeting, i.e., format, will be self-organized. Although there are cases where someone will impose the meeting format on others, there are also more than a few cases where the format will be devised and will emerge from within utterances between each other. So there is a need for participants to discuss with each other, even though initially it may seem like fumbling away in the dark, until the context becomes clear. For example, even though the leader may try to form the context, if that person cannot convince the other participants to accept that context, it will not function as a context. It is therefore necessary to continue the conversation until the context is formed. What we must note here is that context functions to give value to utterances, and at the same time, also

functions as a map showing the kind of content (content of utterances) that is the topic of discussion. So without context, there is a possibility that participants may no longer be aware of the direction the conversation is headed. All participants therefore need a map to confirm what the current topic is.

[4] Share the map that enables context cognition.

If there is a context-related cognitive map, using this will enable judgment to be made on whether the necessary information is available or not. It will also identify the information that is lacking. With this, participants can encourage each other's utterances. Timely utterances requesting necessary information from other participants are important during the course of a conversation. And through such encouraged utterances, new information will be added to the map. Those who encourage utterances will, by listening to the utterances of others, also be able to learn whether their own perceptions were correct or not. If the utterance is irrelevant, it will also make the person who encouraged the utterance realize their own lack of cognitive capability, that is, their ability to understand the topic. Occasionally, there may be cases such as this where irrelevant utterances are requested, but the encouragement of utterances within a meeting means that the importance of one's presence is recognized by the other participants, and if the act of encouraging occurs mutually, the utterances will also become more dynamic. A sense of belonging will arise among the participants. The catalyst for this is the act of acknowledging others, and this is to encourage the utterances of others.

[5] Mutually encourage utterances.

Considering the above, we presented working hypotheses by way of conditions for a meeting to be productively self-organized. Next, we will not just consider this, but carry out observation experiments to further test whether these working hypotheses stand up as hypotheses. Observing how self-organized an actual meeting is will give us an idea on how much information we need for designing specific techniques when conducting empirical research on these hypotheses in the near future.

5. Preconditions for observation experiments regarding the intellectual productivity of meetings

Several preconditions must be cleared for measuring the intellectual productivity of a meeting. First we need to determine the kind of variables necessary for measuring the concept of "intellect", and we must quantify intellectual output. However, when something is decided at a general meeting, there are perhaps very few aspects within it that can actually be quantified. As mentioned earlier, in

this paper our consideration focuses on creative meetings. Therefore, meetings that are to be observed in the experiment must have the aim of producing some form of creative, i.e. intellectual, output. And some device for quantifying this output is essential. Very little research to date has directly addressed intellectual output. For example, in decision-making research “rationality” is a key concept, but rational decision-making does not necessarily produce creative or intellectual output.

Similarly, what variables to use for measuring the concept of productivity is also an issue that must be addressed in the experiment. Output is considered to be an intellectual result, so we must devise variables that form the output denominator. There are, however, few candidates for denominator. “Time” would be an appropriate denominator when assuming decision-making of a general organization. How to produce an intellectual result within the scheduled time is an everyday concern in practical business. Of course, it would also be possible to have “number of persons” inputted into the decision-making process as the denominator, and in practice as well, this is an important issue. If we know the number of team members at which productivity is highest, this knowledge would be useful in team composition and management. However, knowledge and capability differ from individual to individual, so it is difficult to discuss productivity simply in terms of the number of personnel. So in this paper, we will measure productivity with time as the denominator, and look at number of persons for productivity denominator as a future issue.

Next we will consider the condition of meetings to be observed. We need to configure the meetings so that we can confirm that a meeting has high intellectual productivity, while another meeting has low intellectual productivity. In short, we need to observe multiple meetings for comparison.

It is desirable that the meeting members share similar qualities as much as possible. So far we have discussed the functions of distributed cognition, but we also, naturally, have to consider the cognitive capability of the individual. So if the meeting includes some members with a particularly high cognitive capability, those individuals will influence the output of the meeting. While it is not possible to completely eliminate the effect of specific individuals, for research it is preferable to create a situation in which the way the meeting is run and the meeting format will influence the meeting output as much as possible.

In this light, to give numerical value to meeting output, we can present the issue in advance, and then consider methods of judging whether the issue has been resolved. It is difficult to predict the kind of output from a meeting with absolutely no control conditions, and also to compare the output from several meetings. Devices enabling us to make an objective judgment on whether an issue has been resolved or not are essential. There is also a need to set a meeting time limit for resolving the issue when the issue is presented. This will enable us to measure intellectual productivity on a time axis.

We will set the experiment so that it satisfies these conditions, but rather than conducting a new experiment, we will use an existing experiment. As has been pointed out already on a number of occasions, there are many experiment conditions, and some are quite difficult to control, so in this paper, to look into the structure of the hypothesis, we will again watch the recorded meeting videos used in Takagi (1994). We thought that again watching the video through which we detected inconclusive transitions would facilitate lifting this focus to the level of developing techniques.

6. Meetings in the observation experiment

First, in this chapter we will state our reasons for using the video used in Takagi (1994). The following is a summary of the experiment. First-year students on the MBA program at the Keio Business School (a year in the 1990s) were divided into five groups, each of about eight members. The groups were directed to achieve the following theme in two hours.

The theme was for each group to decide on a single prediction based on consensus among all members of the group. The groups were shown the first one-third of the 1950s American movie “Twelve Angry Men”, then each group was asked to predict how the remaining two-thirds of the movie would unfold. The movie revolves around the discussions among twelve jurors who are required to determine whether a youth charged with murder is guilty or not guilty. At the beginning of the movie, one of the twelve jurors insists on a not guilty verdict, while the other eleven believe the youth is guilty. As the movie progresses, the eleven jurors who advocated a guilty verdict over time gradually changed their opinions to not guilty one after the other. The movie ends at the point when all twelve jurors have agreed on a not guilty verdict. The first one-third of the movie takes us up to the point just before the first of the eleven jurors who advocated a guilty verdict changes his opinion to not guilty.⁴

This experiment covered virtually all conditions listed in 5. First, the aim is to look at meeting productivity, so, preferably, we should be able to make an objective comparison of each of the group’s productivity. In this experiment, the order of the 11 jurors is determined, so we can quantify the extent to which each of the groups accurately predicted the result. In other words, we are able to ascertain the level of achievement or creativity of the meetings. The time limit imposed would also enable us to ascertain the difference in productivity by each group. Moreover, we thought that since all group members were MBA students in the 1990s, no one would have an especially detailed knowledge about a movie produced in the 1950s.

The groups were given no special directions other than the theme mentioned above. Who would preside over the meetings or be group leaders was not determined in advance. It is therefore

⁴ Takagi (1994) p.59.

assumed that with no specific format laid down from the beginning, the meetings started in a natural way. All group members viewed the first one-third of the movie together, so there was no variation in the information given before discussion. From the above points, we believe the results emerging from each of the groups were greatly influenced by the content of discussions within the respective groups. So we judged this to be suitable as an experimental observation.

Under these conditions, the progress of discussions in the five groups was videotaped. Differences in performance emerged for each of the groups. Performance indicates how much the accuracy improved between individual prediction decisions before discussion, and decisions after discussion. The groups were classified from the group with the highest level of increased accuracy to the group that had no increase in accuracy whatsoever. The group with the highest level of increased accuracy is to be referred to as Group A, and that with the lowest level of accuracy increase is to be referred to as Group B. As already seen in Takagi (1994), inconclusive transitions did not occur at all in the Group A meeting, whereas in the Group B meeting, four cases of inconclusive transition occurred per hour. In short, for all themes raised in the meeting, the group that improved accuracy reached some form of consensus on a theme before moving on to the next theme. The group that could not improve accuracy moved on to the next theme without first forming a consensus on the previous theme.

This paper will therefore again closely observed the conditions of Group A and B meetings to explore the differences. For this, we will use the five conditions for meetings to be productively self-organized listed in 4.

7. Comparison between meetings with high and low intellectual productivity

The meeting of Group A, whose intellectual productivity was high, proceeded as follows.

[Flow of the Group A meeting]

10:30 — Start

Begin listing on the blackboard the order thought by participants.

10:35 — Complete writing on blackboard.

Discussion on whether to begin looking from the second or twelfth juror.

Decision was reached to look from the second juror. After circling their second juror on the blackboard lists, members gave their respective reasons for choosing the juror they did.

10:46 — Added the average value for the order given by individual members to the blackboard list.

10:47 — Topic changed. Time was spent to confirm all members understood what the jury system is.

10:54 — Members envisaged how the movie would unfold from the cast of actors and movie storyline. From this, they began working out who would be the second juror.

11:01 — All members agreed on the second juror.

Amended the list on the blackboard.

Began discussing the third juror.

11:11 — Race became a topic based on the photographs. Prediction was made from racial issues.

11:40 — Decided to narrow down third juror to three candidates for discussion.

11:43 — All members agreed on the third juror.

Amended the list on the blackboard.

11:44 — Discussion on whether to look at fourth juror or twelfth juror. During discussion, decided to focus on fourth juror.

11:55 — All member agreed on the fourth juror, and at the same time, on the fifth juror.

Amended the list on the blackboard.

12:06 — All members agreed on sixth and seventh jurors at the same time.

Amended the list on the blackboard.

12:07 — All members agreed on the eighth juror, followed by the ninth juror.

12:15 — All members agreed on the tenth, eleventh and twelfth jurors in succession.

Amended the list on the blackboard.

What we first notice when looking at a meeting like the one mentioned above is that the meeting format is consistent with no ambiguity, and allows members to discuss matters within a stable framework until the meeting ends. That is, the perspective is the order in which jurors in the movie change their opinion. The context was clear, so it was easy for members to speak, and for others to respond to those utterances. All participants were able to judge what kind of utterances was important.

Once a decision on a juror had been made, it was written on the blackboard without fail, so group members could immediately see and understand the result of the discussions, i.e., where they had reached, simply by looking at the blackboard. Moreover, confirmation by all members of the discussion results is also thought to have deepened their understanding. The blackboard played the role of a map for cognition.

On forming consensus, discussions continued until all members were satisfied with the outcome, and we could observe the high regard they held for the meeting itself. This we feel represents a belief by the participants in the possibilities of distributed cognition.

The meeting covered not simply information presented by the movie, but also incorporated the participants' own views on how the movie would unfold if they were director. The meeting also took up the social perspective of race. We can say these perspectives contributed to expand the outlook.

Next we will examine the meeting characteristics of Group B, whose intellectual productivity was low.

[Flow of the Group B meeting]

10:30 — It was suggested to split the jurors into three groups: those who would appear to advocate not guilty quickly; those who would appear to advocate not guilty; and those who are hard to predict. The importance of reaching a consensus was stressed.

10:35 — Instead of the above, it was suggested to list the individual predictions of members. Each member read out their own predictions, and other members wrote these down on a sheet of paper.

10:39 — Writing completed.

10:40 — Members checked the differences in each other's predictions and ideas.

10:53 — Confirmation of strategy. Discussion on which number juror is easiest to decide.

Group decided to take the average values of each member's order prediction for examination. All members divided this up and calculated average values. Placed in order according to the average values. Wrote down the results on the blackboard. For jurors with very little difference in average values, member confirmed their respective reasons.

(From around this time, one participant stood in front of the blackboard and sought to lead the discussion from beginning to end.)

From average values, all members agreed on the second juror.

11:13 — From discussions, members decided on the third juror by majority vote.

11:18 — Members decided to discuss four candidates as the fourth juror.

11:27 — From discussions, members decided on the fourth juror by majority vote. They then decided to rank the remaining three candidates in order.

11:32 — All members agreed on the fifth, sixth and seventh jurors.

11:38 — To confirm what had been decided, they wrote the blackboard list on the sheets of paper.

They then changed the approach to decide on the twelfth juror.

11:57 — From discussions, members decided on the twelfth juror by majority vote.

Then decided to look at the eleventh juror.

12:02 — From discussions, members decided on the eleventh juror by majority vote.

12:03 — Decided to look at eighth juror first.

12:05 — From discussions, members decided on the seventh juror by majority vote.

12:06 — From discussions, members decided on the eighth juror by majority vote.

12:08 — From discussions, members decided on the ninth juror by majority vote. The tenth juror was therefore decided automatically.

The first thing that stands out in the overall meeting flow is the preponderance of judgments by majority vote. Even when the order was not decided by majority vote, the discussion was carried out premised on the average values of ranking order by all members, and it is hard not to feel that the discussion was fairly mechanical. Mechanical means that members can only expect results that simply combine the cognition of those participating in the meeting. They do not seem to believe in the possibilities of distributed cognition that something new will be generated from the meeting. For example, in an informal conversation, someone mentioned “What the group decides and what the individual decides are two separate things.” This utterance is clearly indicative of a lack of belief in the creativity of the meeting.

At the same time, deciding by majority vote will choke off utterances with the timing of the decision rather than mutually encourage utterances. Certainly at first glance it may seem rational decision-making, but participants who have to break off their utterances may lose their enthusiasm to speak further. They may take such an attitude especially if the result of the majority vote is different from their own idea.

Next we noticed that the strategy of the meeting changed many times. This seems to have made it difficult to maintain the framework for how participants could consider aspects. In particular, changing the strategy five minutes after the start of the meeting not only causes a loss of time, but may generate misgivings about how the subsequent meeting format would be maintained. In any event, participants probably felt some doubt about whether they would be able to take part in discussions under a stable format. To be slightly more specific, shortly after the meeting started, one member expressed his/her idea suggesting that they exchange information, and to this, other participant started giving their own impressions and comments about this suggestion. The strategy was changed five minutes into the meeting in an effort to break through this situation.

A change in meeting strategy makes it difficult for participants to confirm what is currently being discussed. Without a cognitive map, the meeting could wander about in confusion, resulting in all members losing the means to determine the direction of the meeting.

In any event, in a situation such as that above, we cannot really expect context to be formed within the meeting, giving rise to the possibility that utterances will be disconnected. That is, not all members understood the rules setting standards for responses to certain utterances, and this was probably an underlying factor in inconclusive transitions. Thus the group may have employed majority voting in an effort to give some form of direction to the meeting which in this way had become directionless.

Another characteristic feature was that about 20 minutes into the meeting, one participant stood up in front of the blackboard and began to run the meeting. This pressured participants to make decisions over short periods of time. This person constantly urged participants to decide by majority

vote. So, as in this case, when the meeting format is such that it does not facilitate the full mutual exchange of cognition, the intellectual productivity of the meeting seems to be diminished.

Looking at the meeting formats of Group A and Group B reveals some significant differences. Comparing the two from a distributed cognition perspective, we can summarize the main features of meetings with a high level of intellectual productivity as follows.

Meetings with high intellectual productivity:

- 1) *believe in the possibilities of distributed cognition,*
- 2) *reduce the cognitive load of the individual,*
- 3) *are designed so that the overall meeting condition is understood, and*
- 4) *have stability in format strategy.*

8. Techniques for raising meeting intellectual productivity as hypotheses

In conclusion, this paper will discuss specific techniques for raising the intellectual productivity of meetings. As has already been pointed out, from observation, albeit limited, we know that meetings with high intellectual productivity have four characteristic features. Here, we will list as hypotheses what kind of techniques can be considered from each characteristic.

1) Hypothetical techniques around distributed cognition

The reasoning for not placing emphasis on distributed cognition is a belief that the cognition of the individual is superior. Which is superior is a difficult issue to settle, but as long as participants do not recognize the possibilities of distributed cognition, theoretically, the meeting cannot become creative. So the issue is how to convince participants of the possibilities of distributed cognition. One specific technique is to for participants to get together before the meeting begins and urge each other to “make the meeting creative”. In practice, there are a great many meetings, and there are people who think many of these meetings are a waste of time. This is why confirming and expressing the will to make the meeting fruitful to each other before the meeting begins is highly effective.

2) Hypothetical techniques for reducing the cognitive load of the individual

This is easy to relate to as a technique. And there is also a considerable amount of research on this. For example, techniques can include the regular use of the blackboard to confirm the progress of the discussion, or the extensive use of memos and photographs. Not just tangible aspects, but clarifying context as well can reduce the cognitive load of the individual. For example, utterances

confirming what the current topic is, and where the discussion is broken off, i.e., utterances that mark points within the meeting, are important as a technique.

3) Hypothetical techniques for raising overall cognition

Recognizing the overall condition of the meeting, that is, discussing and acquiring meta-cognition, is difficult. However, as was actually observed in the meeting experiment, it is not particularly difficult if a third-person viewpoint is brought in, i.e., when the discussion is broken off or does not advance, move away from the viewpoints of the meeting participants, and take the viewpoint of a third person who would seem to be able to serve as a useful reference. This viewpoint takes the form of “if it were so-and-so, how would he/she tackle this problem?” This assumed person would preferably have a broader or more technical viewpoint than meeting participants.

4) Hypothetical techniques for stability in meeting format strategy

Meeting strategy should preferably have stability. If, however, too much importance is placed on this, the meeting can lose direction. One example of this is the groupthink that has already been pointed out. What we must note here is given that the strategy may change several times during the meeting, participants must be aware that changes will be made if necessary. This will be maintenance of stability in the sense that once a strategy has been decided, discussion will proceed in line with that. The important point is that the strategy is stable, and lead by the strategy, meeting participants are able to focus their discussion on the specific issues at hand.

The techniques we have listed are based on a number of theoretical considerations, and the results of comparative studies between two meetings. These techniques are, therefore, ultimately hypotheses. Naturally, we believe these techniques need to be substantiated. In particular, we believe that comparisons among a larger number of meetings are essential. And we believe there is a need to develop new approaches regarding the method of observation itself.

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