

Recommended Paper

# The Measurement of Dialogue: From a Case Study of the Workshop Using World Café as a Collective Dialogue Method

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**Abstract:** In this paper, we will present the results and implications of analyses of the dialogue process and its consequences by conducting a case study of the workshop using the World Café as a collective dialogue method. The workshop addresses a new way of working in a Japanese company after the earthquake on March 11, 2011. We investigated both dialogue processes quantitatively and qualitatively, the level of recognition of the workshop theme, and participants' actions and their effects after the workshop. The results indicate that the more active the quantitative dialogue process is, the more positively the participants feel about the quality of the dialogue process and the more actions the participant takes. To understand the dialogue process in a workshop could be useful for practitioners and researchers to develop a facilitation method or supporting system that could promote better dialogues leading to better actions and effects.

**Keywords:** measurement, dialogue, whole systems approach, world café, collective intelligence, collective wisdom

## 1. Introduction

In the information age that have been rapidly spreading in the latter part of the 20th century, it is no doubt that complexity has been increasingly permeating almost every aspect of our lives across organizations such as countries, companies, non governmental organizations, non-profit organizations, and so on [18]. In such era of massive complexity, the whole systems approach begins to attract much attention as a method of fundamental issue exploration, which is different from a problem solving approach where people clearly know the problem that should be solved. The whole systems approach is a method of transforming any business into a thriving organization by aligning internal systems with external forces and engaging the hearts and minds of every person [2]. This approach is a practical method for all stakeholders in order to collectively make decisions and take actions for achieving profound changes. There are several methods for the whole systems approach, such as the World Café [7], Appreciative Inquiry [26], Open Space Technology [19], and Future Search [24]. Even though whole systems approaches have become widespread, practitioners and researchers focus on the art of skills training and the applications of the approach [9], [18]. Less research has been done to measure the effects of the approach [11] in order to understand the mechanism and to improve a method or develop a supporting system based on this approach.

In this paper, we focus on the whole systems approach as a collective dialogue method that is appropriate for the era of massive complexity in the information age. In order to consider the possibility of this approach, we focus on dialogue as a measurement point, which is a shared inquiry within and between people [4], [14], [18] that can be observed as interactions. We conducted a case study of a workshop by using the World Café [7] as a facilitation method of this approach, which makes use of a style of casual conversation in a cafe and includes multiple rounds of dialogue in a small group. We investigated the dialogue process and the results in the workshop, examined the usefulness of a dialogue lens as for exploring the mechanism of this approach, and considered the possibility of the development of a facilitation method or supporting system based on this approach.

## 2. Related Works

### 2.1 Dialogue Lens as a Measurement Point of a Whole Systems Approach

Large Group Methods or Interventions are methods or interventions used to gather a whole system together to discuss and take action on the target agenda. That agenda varies from future plans, products, and services, to redesigning work, to discussion of complex issues or problems. All participants in a meeting or workshop are regarded as stakeholders that could not only consider the problems or issues but also solve them. In that sense, the method or intervention is called a whole systems approach

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in organizational development [3], [8], [25]. In the Annals of the Academy of Management published in 2012, Bartunek et al. indicated that large group interventions, methods for involving “the whole system” in a change process, were well known to practitioners but unfamiliar to many organizational researchers even though these were important contemporary planned organizational change approaches [3]. As Bunker and Alban indicated in their introduction to the special issue on large group intervention, practitioners were just beginning to work with and create new methods for gathering whole systems in one place to plan and make decisions twelve years ago [8]. Since then, while there have been many reports on the success of the whole systems approach [2], the large group method [25], the large group intervention [8], research on these methods and approaches mostly can be classified as qualitative case studies [1], [6], [13], [21], or proposals of their background theories [4], [8], [9], [12], [14], [18], [25].

Fullarton and Paermo conducted a progressive research consisting of a comparative and qualitative evaluation of the World Café as a method of a large group method and a large group facilitation as a non-participatory meeting in an educational institution. They conducted an evaluation survey to the participants attending both types of workshop and found that the World Café was superior to large group facilitation in increasing participants’ knowledge and understanding. They indicated that future research should quantitatively evaluate the evidence of the usefulness of these methods in addition to the qualitative research [11].

Interactions comprise an essential and observable component of collaboration among the participants of a meeting or workshop using these methods. In describing the most desirable form of interactions, most researchers and even practitioners specifically refer to the notion of dialogue [4], [14], [18], which is defined as a shared inquiry, a way of thinking and reflecting together [14]. Tsoukas conducted progressive research on the creation of new knowledge by focusing on dialogical process and found that dialogue leads to self-distanciation, in which individuals distance from their customary and unreflective ways of acting as practitioner. This leads to new distinctions through three processes of conceptual change (conceptual combination, conceptual expansion, and conceptual reframing), which when intersubjectively accepted, constitute new knowledge [23]. While dialogue is regarded as an essential and observable component, very little research on its process and effects has been conducted. In order to understand the process and effects of these methods or approach, we should focus on the dialogue process from both the quantitative and qualitative viewpoints.

## 2.2 Measurement of the Results of Collective Intelligence and Wisdom

We focus on the whole systems approach as a social technology for cultivating collective intelligence and wisdom [9], [18]. Although many studies measuring the short-term results and its conditions of collective intelligence and wisdom in group or team collaboration have been conducted as laboratory experiments, little research exists on the long-term consequences [11]. For example, Page intensively focuses on participant diversity as one of the essential conditions for the emergence of collective intelligence

and wisdom [20]. In the book, *Group genius*, the author introduces a series of studies on group collaboration and the results of successful and failure cases of brainstorming experiments, improvisational collaborations in sport and jazz, user-side innovation in communities of open source software, and Web-based collaborations [22]. These all concern the short-term results of collaborations, which means that they are evaluated once just after having collaborations. Recent research on collective intelligence indicated a general collective intelligence factor that explains a group’s performance is correlated with the average social sensitivity of group members, the equality in distribution of conversational turn-taking, and the proportion of females in the group [27]. The results were extracted from a lot of controlled laboratory experiments concerning the short-term results.

In a workshop by using a whole systems approach, participants would finally take actions based on their commitments through dialogical process. Even though the goal of the workshop should be to get the results such as organizational change and innovation, less research has been conducted on the evaluation of the long-term consequence caused by the actions [11]. We should focus not only the short-term results within the workshop but also the mid- or long-term results after the workshop.

## 3. Research Setting

We selected the World Café [7] as a facilitation method for a whole systems approach. There are two reasons why we chose the World Café in our experiment setting. The first reason is that the process of the World Café is simpler than others such as Appreciative Inquiry [26], Open Space Technology [19], and Future Search [24]. The facilitator of the World Café can proceed without needing much intervention, meaning that facilitation does not require specific skills or experience. The second one is that the World Café requires a minimum of about two hours per session even though the others need one to three day(s) according to their facilitation guides. These reasons could make evaluations much accurate even in our actual setting that will be described in the next section. Because these could make the World Café more popular in an actual setting in a community and company than the others, implications from the study could also be widely applicable.

### 3.1 Site

#### 3.1.1 Background

We investigated workshops using the World Café in a large manufacturing company. The purpose was to make workers explore creative and energy-saving actions among themselves, which we call a “creative-eco work style”, and to commit to certain actions. Pursuant to the Electricity Business Act established after the earthquake on March 11, 2011, in Japan, large electricity customers were obligated to reduce their electricity usage by 15% from the previous year in order to minimize the risk of blackouts the following summer. A department of this company decided to conduct workshops in order to transform their work style to a creative-eco work style that would enable them to save another 15% in electricity usage in addition to the 15% mandated by the Act, and also make their workers more creative. The goal of the

**Table 1** The attributes of each session.

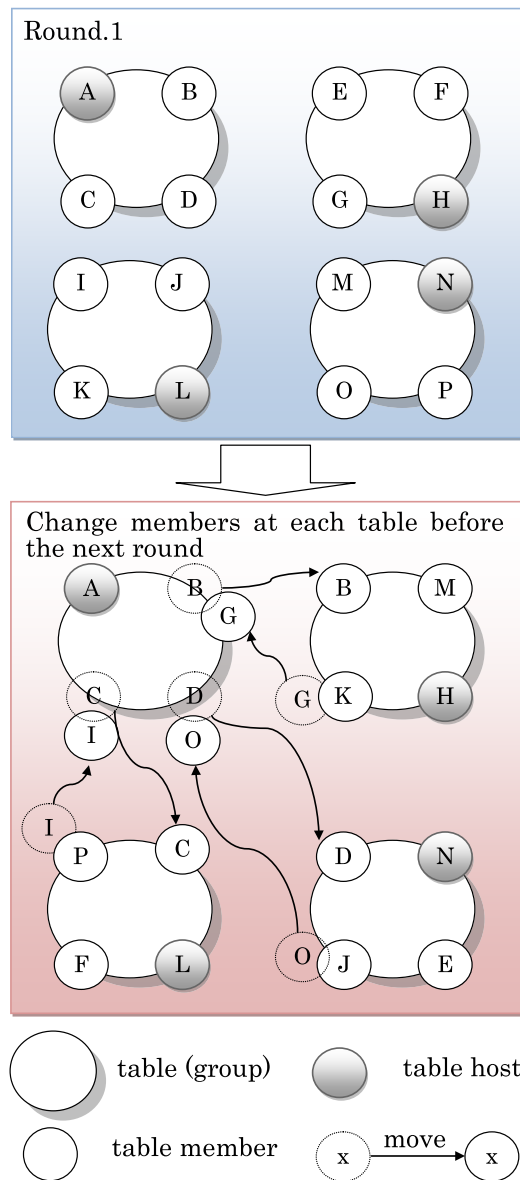
Session	# of participants	# of tables	# of participants at each table
1	13	4	4, 3, 3, 3
2	12	3	4, 4, 4
3	16	4	4, 4, 4, 4
Total	41	11	-

workshop was not only to commit to actions through dialogue, but also obtain the results of the actions.

**3.1.2 Workshop Design and Participants**

We conducted three independent sessions with 41 participants randomly selected from among 161 employees in the department. Each session lasted approximately an hour and 45 minutes. **Table 1** shows the number of participants, the number of tables used, and the number of participants at each table in each session.

The same facilitator hosted all three sessions using the same process, which was based on ordinary World Café processes [7]. The theme of the session was “creative-eco work style.” Before the session, participants were roughly guided to sit down as a group of four or three around the table. At the beginning of the session, the facilitator asked participants to do one-minute and one-way talk in random order within each table, which is called check-in (5 minutes in total including 1 minutes buffer for a group of four). The check-in is a way of ice-breaking method that could bring participants into the purpose of the theme and allow them to be more fully present in the discussions. In the check-in of this workshop, each participant was requested to introduce a unique energy-saving activity that they knew of. After a five minutes introduction that explained the workshop theme and process, in order to encourage participants to generate reflections on the theme, the facilitator asked participants to spend five minutes silently considering and writing down their initial thoughts about the creative-eco work style. Then they began the body of the World Café session. The session consisted of three rounds of 25 minutes each. An A0 sized paper and 18 colors pen were prepared on a table in advance. Participants were encouraged to pick up a pen in order to write down their individual or shared memos as letters or drawings on the paper while having dialogues. After the first round, at each table, three members except for a table host moved to another table. The table host at each table was selected based on the rough consensus among the table members in terms of who would be the best person for introducing their talk to the next round members. **Figure 1** shows this member change process across tables between the first round and the second one. Note that this process would not be strictly conducted by the facilitator but roughly coordinated by members themselves. The table host summarized the previous dialogue to the new members in 2 to 3 minutes; then the new group carried on a dialogue on the same theme. After conducting three rounds, the participants moved on to a reflection session, during which each participant spent five minutes silently writing a description of their final commitment to saving energy. The facilitator grouped the participants by commitment and let them share their commitments in detail in each group for 10 minutes.



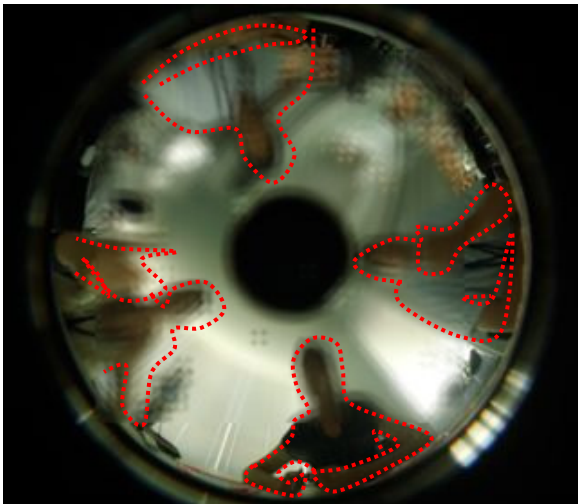
**Fig. 1** Member change process.

**3.2 Measure**

This section illustrates how we measured the four viewpoints: observations of the dialogue process (quantitative dialogue process observations), assessments of the dialogue process (qualitative dialogue process assessments), level of participants’ recognition of the workshop theme (recognition of theme), and participants’ actions and their effects after the workshop (results of actions).

**3.2.1 Quantitative Dialogue Process Observations**

To observe the dialogue process during the World Café, we placed a 360 panoramic video camera (SONY, bloggier) on each table in order to record upper body motion as an indicator of communicative action. The facilitator explained the experiment, including the extent of data usage we were observing. We covered the 360 panoramic video cameras with paper in order to encourage participants to focus on the dialogue. We manually coded the data for each of the 10 seconds intervals from the coding scheme, programming it to identify factors such as utterance, facial expression, and gesture. **Figure 2** is a screen shot captured by the



**Fig. 2** Screen shot of video captured by 360 panoramic video camera with dotted lines that illustrate the borderline of the upper body of each participant at a table.

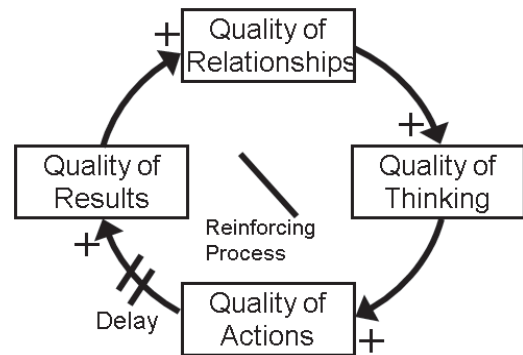
**Table 2** The coding scheme for quantitative dialogue process measurement.

Category	Definition of categories
Backward tilting	Whether or not a participant explicitly leaned against the backrest of a chair
Forward tilting	Whether or not a participant explicitly put his/her elbow on the table
Utterance	Whether or not a participant said something (only estimated by motion of mouthing)
Nod	Whether or not a participant explicitly nodded
Smile	Whether or not a participant explicitly smiled
Tilt one's head to one side	Whether or not a participant explicitly tilted his/her head to the left or right side, which mostly implies skepticism in Japanese culture
Gesture	Whether or not a participant explicitly made any gesture outside of other coding categories
Pen	Whether or not a participant wrote something on a shared paper with a pen

360 panoramic video camera. Even though the screen shot is unclear for the privacy reason, we can identify who talked from the movement of their mouth in a clear video movie including upper body of 4 different participants. Each dotted line was manually added in order to illustrate the borderline of the upper body of each participant at a table. **Table 2** presents the coding scheme. We indicated a score of “1” if we observed an element of the coding scheme, added up the number of observations for each participant for a total score, calculated the average total normalized scores for each round, which were then divided by the total score for each category according to the duration of each round.

### 3.2.2 Qualitative Dialogue Process Assessments

We conducted a questionnaire in order to investigate the level of the participants’ recognition of the workshop theme (the creative-eco work style) and their assessments of the dialogue process. Although many studies have been conducted on theories and practical dialogue applications, little is known about how to evaluate it as a process. In order to investigate the qualitative characteristics of the dialogues process, we referred to a “core



**Fig. 3** Core theory of success [16].

theory of success” as a model of successful dialogue shown in **Fig. 3**, which is a reinforcing cycle described by system dynamics [16]. In this model, as the quality of relationships rises, the quality of thinking improves, leading to an increase in the quality of actions and results. Achieving high quality results has a positive effect on the quality of relationships, creating a reinforcing cycle. We composed 31 questions on the basis of this model and conducted a factor analysis in order to extract factors as rating scales.

As **Table 3** shows, we extracted five factors, interpreted the meaning of factors, and confirmed that each one mostly corresponds to each quality in the model. Note that both the third and fifth factors corresponded to quality of thinking. While the third factor could be interpreted as internal feeling or participants’ recognition of collective thinking, the fifth factor could be interpreted as external conditions, such as visual aids for collective thinking. After eliminating two questions with less than a 0.4 factor loading, we finally calculated factor scores for each factor and for each person using 29 questions.

### 3.2.3 Recognition and Ownership of the Theme

We conducted a questionnaire with participants, including qualitative dialogue process assessments, just after the session in order to investigate the level of recognition and sense of ownership they felt toward the workshop theme. The questionnaire included two types of questions using a five-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = somewhat agree; 4 = agree; 5 = strongly agree):

- The level of recognition of the workshop theme
- Were you interested in the “creative-eco work style”?
- Did you understand the importance and necessity of the “creative-eco work style”?
- Did you empathize with the importance and necessity of the “creative-eco work style”?
- The level of ownership toward the workshop theme
- Did you seriously consider what you should do in order to achieve the goal of a “creative-eco work style”?

### 3.2.4 Results of Actions

As mentioned in Section 2.2, we focus on cumulative evaluation of participants’ repeated actions as mid- or long-term result in addition to one time evaluation just after a workshop as short-term result discussed in the previous Section 3.2.3. We conducted another questionnaire three weeks after the workshop in order to investigate the effect of their behavior, such as the extent of their

**Table 3** Results of factor analysis, Cronbach's alpha of a factor, and the type of quality in the model.

Question	Factor loadings					Interpretation of factor	Type of quality		
	1	2	3	4	5				
You had higher quality thoughts and ideas than usual.	<b>.892</b>	-.086	.178	-.148	.048	Active and collective participation	Actions		
You had more thoughts and ideas than usual.	<b>.855</b>	.287	-.352	-.107	.070				
You considered a wider variety of thoughts and ideas than usual.	<b>.851</b>	.061	.181	-.353	.057				
You agreed that the participants collectively had higher quality thoughts and ideas through dialogue with each other than when each participant thought independently.	<b>.712</b>	.096	-.013	.227	-.060				
You had thoughts and ideas as a result of others' thoughts and ideas.	<b>.688</b>	.115	-.01	.127	-.170				
Listening to others' thoughts and ideas made you consider an issue from a more advanced viewpoint.	<b>.682</b>	-.376	.021	.409	-.143				
You had higher quality thoughts and ideas in the session than in an ordinary meeting.	<b>.450</b>	.338	.106	.204	.114				
You did not hesitate to talk about your thoughts and ideas without taking others' into account.	.121	<b>.865</b>	-.202	-.176	.005				
You were not nervous about participation.	.039	<b>.822</b>	-.111	.119	.071				
You felt that you are the right person to have a dialogue with about the theme.	.381	<b>.636</b>	.022	-.136	-.087			Safe and creative thinking environment	Thinking
You agree with that all participants tried to contribute to the session through active participation.	-.073	<b>.609</b>	.024	.334	-.128				
You agree that participants built good relationships through the session.	-.021	<b>.509</b>	.058	.368	.054				
The facilitator was flexible about time management according to the status of the session.	-.174	<b>.504</b>	.024	.033	.490				
The delivery of the session was effective in terms of time management.	-.253	<b>.494</b>	.307	.244	-.019				
Participants knew each other very well through the session.	.141	<b>.420</b>	-.144	.326	-.069				
You emphasized the final output shared in the harvest session.	.022	-.271	<b>.946</b>	.016	.065				
You understand the final output shared in the harvest session.	-.032	-.101	<b>.930</b>	-.001	.080				
You agree that the facilitator did not make any unreasonable requests in the session.	-.078	.029	<b>.696</b>	.145	-.115	Positive feeling of the results	Results		
You were interested in the theme of the session.	.392	.287	<b>.592</b>	-.101	-.141				
You agree that the theme was critical for the current situation of your company.	.211	.382	<b>.553</b>	-.099	.030				
You agree that the selection of the participants was appropriate for the theme.	-.190	.371	-.212	<b>.697</b>	-.031	Appropriate participants	Relationship		
You agree that the diversity of participants was enough to create a variety of thoughts and ideas.	.385	-.182	-.319	<b>.696</b>	.044				
You agree that the thoughts and ideas in the session should be re-coded in order to reuse them in future.	-.179	-.032	.226	<b>.680</b>	.080				
You built new relationships with the thoughts of others in the session.	-.100	.267	.26	<b>.656</b>	-.236				
You agree that the session had various methods of creating new thoughts and ideas.	.246	-.122	.248	<b>.479</b>	.304				
You built relationships of mutual trust with other participants.	.017	.338	.111	<b>.463</b>	.168				
You agree that participants shared their thoughts and ideas visually, including those regarding their relationships.	.029	-.200	.081	.003	<b>.901</b>			Visualization of thinking process and results	Thinking
You agree that the thoughts and ideas were quickly visualized in order to be shared among participants.	-.240	.126	-.03	-.101	<b>.836</b>				
You agree that the sessions provided various methods for thinking and considering ideas from different viewpoints.	.249	.060	-.078	.274	<b>.745</b>				
Cronbach's alpha	.896	.845	.877	.805	.812				

electricity saving and the degree of the change in creativity. The questions were as follows:

- How much energy did you save by taking action on the basis of the commitment you made in the workshop? (Wh/week) Please refer to the following instructions for calculations and examples.  
(1 = under 10 Wh; 2 = 10 Wh; 3 = 50 Wh; 4 = 100 Wh; 5 = 200 Wh; 6 = 500 Wh; 7 = 1,000 Wh; 8 = 1,500 Wh; 9 = 2,000 Wh; 10 = over 2,000 Wh)
- How would you evaluate the change in your creativity while you were taking action on the basis of the commitment you made in the workshop?  
(1 = clearly lower; 2 = lower; 3 = no change; 4 = higher; 5 = clearly higher)

Note that we gave detailed instructions for estimating the amount of energy saving and examples of energy saved.

#### 4. Models

We explored the first model by using each measurement

variable, which we regarded as a latent variable of structural equation modeling [5] in reference to the time ordering of measurements: the quantitative dialogue processes observation that were observed in the session, the qualitative dialogue process assessments, the recognition of the theme (which was evaluated just after the session), and the results of actions (which were reported by the participants three weeks after the session). The first model we hypothesized is the following: if more active participants attended the session, they would have a positive feeling toward the recognition of the quality of the dialogue process and workshop theme. This would lead to more effective action toward the fulfillment of their commitments.

#### 5. Results

Tables 4 to 7 show the descriptive statistics for each variable: the quantitative dialogue process observation, factor scores for the model of the qualitative dialogue process assessments, the recognition and ownership of the theme, and the results of actions.

**Table 4** Descriptive statistics for the quantitative dialogue process observation (normalized by total time per participant).

	N	Min	Max	Mean	SD
Backward tilting	40	.0	4883.7	1410.1	1526.5
Forward tilting	40	26.9	8640.0	5739.8	2376.7
Utterance	40	664.5	6090.1	2917.9	1307.1
Nod	40	643.5	8073.8	3803.3	1840.8
Smile	40	479.9	4488.1	2252.4	1054.3
Tilt head to one side	40	.0	776.6	99.1	169.8
Gesture	40	116.7	3299.5	1457.8	786.2
Pen	40	.0	2709.6	484.0	664.5

**Table 5** Descriptive statistics for factor scores of qualitative dialogue process assessments (factor scores based on values using a five-point Likert scale).

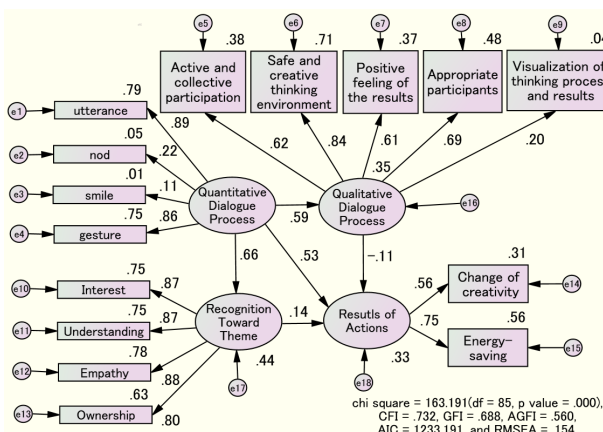
Factor	N	Min	Max	Mean	SD
Active and collective participation	40	1.4	4.0	2.70	.67
Safe and creative thinking	40	2.6	5.0	3.94	.65
Positive feeling toward the results	40	1.0	5.0	3.31	.85
Appropriate participation	40	1.3	3.8	2.88	.58
Visualization	40	1.3	4.3	2.65	.75

**Table 6** Descriptive statistics for the recognition and ownership of the theme (values using a five-point Likert scale).

Level of recognition of the theme	of Interest	of Understanding	of Empathy	N	Min	Max	Mean	SD
Level of interest	40	1	5	3.35	.975			
Level of understanding	40	1	5	3.23	1.000			
Level of empathy	40	1	5	3.32	.971			
Level of ownership	40	1	5	3.38	1.079			

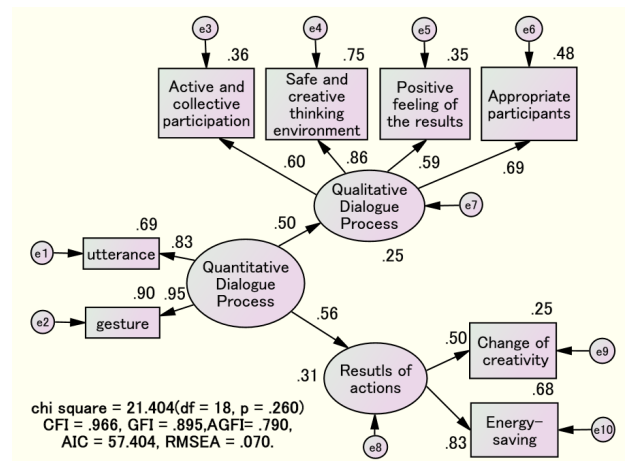
**Table 7** Descriptive statistics for results of actions (amount of electricity saved: values using a ten-point ranking scale, degree of change in creativity: values using a five-point Likert scale).

	N	Min	Max	Mean	SD
Amount of electricity saved	40	0	10	4.65	3.000
Degree of change in creativity	40	0	4	3.27	.716



**Fig. 4** Path diagram (model 1).

We applied structural equation modeling [5] using AMOS 19 to explore a more appropriate model for the relationship between latent variables and their indicators as observable variables than the first model (model 1). **Figure 4** shows the path diagram and the results of applying SEM to model 1. The overall SEM model



**Fig. 5** Path diagram (model 2).

fit for model 1 was not good. The model’s Chi-square = 163.191 (df = 85, p = .000), CFI = .732, GFI = .688, AGFI = .560, AIC = 1233.191, and RMSEA = .154. In order to improve model 1, we tried to add a new path and eliminate the path that was not statistically significant in the diagram. **Figure 5** shows the final model with moderate scores of fit indices on the basis of the recommended scores. In model 2, the Chi-square = 21.404 (df = 18, p = .260), CFI = .966, GFI = .895, AGFI = .790, AIC = 57.404, and RMSEA = .070. In model 2, the more active a participant’s quantitative dialogue process is, the more positively the participant feels about the quality of that process and the more action the participant takes.

## 6. Implications

### 6.1 Better Dialogue Leading to Better Actions and Their Aftereffects

Model 2 indicates that the more actively a participant engages in quantitative dialogue processes (as shown by the number of utterances and gestures made during the dialogue), the more the participant will perceive the dialogue process as positive and the more action he or she will take to effect energy saving and change their feelings about their own creativity. Even though this model could not be generalized without conducting other case studies and more detailed analyses, this study could be thought of as the first step in trying to quantitatively and qualitatively analyze the dialogue process within the World Café as a whole systems approach and its aftereffects.

### 6.2 Usefulness of the Integration of Art, Practice, and Science of Dialogue

Researchers and practitioners in the area of whole systems approach tend to focus on skills as art and their applications as practice more than measurements of their dialogical process and their effects as science [9], [18]. Even though we admit the usefulness of both art and practice sides, to observe the dialogue process and its result could be also useful even for practitioners. For example, if the facilitators understand the process of dialogue, they can reflect on their facilitation more deeply. If the participants understand the changes in their actions and their effects, they may feel a greater sense of community and engage in collective action in

order to achieve better results. The art, practice, and science of dialogue should be integrated for deeper understanding and further development of the whole systems approach.

### 6.3 Facilitation Method and Supporting System Based on Whole Systems Approach

The results of the analyses from the four measurement points could be useful in improving or developing facilitation processes and training facilitation skills. In the book, *The Power of Collective Wisdom and the Trap of Collective Folly*, the authors indicate that, although we cannot will collective wisdom to arise in groups, we can make preparations that encourage its emergence [9]. If a facilitator knows the status of dialogue processes, he or she could encourage participants to have collective dialogues among them. Even though this study used a 360 panoramic video camera, a variety of other methods for capturing conversations have already been introduced such as a sociometric badge developed by MIT [17]. The sociometric badge is a wearable electronic device capable of automatically measuring the amount of face-to-face interaction, conversational time, physical proximity to other people, and physical activity levels based on social signals derived from vocal features, physical movement, and relative location [17]. If the real-time status of dialogue processes could be shown to the facilitator, they could change his or her behaviors by appropriately responding to the participant statuses. For example, the number of utterances and gestures appearing in the model 2 as measured variables could be interpreted as active participation with active body movements, which have a positive effect on both the qualitative dialogue process and the results of actions. The facilitator could include bodily engagement practice in the facilitation process, or encourage equal numbers of utterances among participants. As for the timing of feedback of communication patterns, DiMicco et al. proposed Second Messenger, a system of dynamic awareness displays that reveal speaker participation patterns in a face-to-face discussion. They progressively discussed the effects of feedback timing such as real-time, replay, and both real-time and replay settings by using this system. Their findings suggest that awareness applications bring about systematic changes in group communication styles, highlighting the potential for such applications to be designed to improve group interactions [10]. Further research should be conducted in terms of feedback timing and its effects, as well as the possibility of improvement both individual behavior and group interaction.

## 7. Limitation and Future Research

This paper focused on individual data, but future research must conduct analyses of dialogues in and across groups, such as social network analysis of the interactions among members at a table as well as those across tables built through multiple rounds in the World Café. As Woolly et al. indicated, a group's performance is correlated with the average social sensitivity of group members, the equality in distribution of conversational turn-taking, and the proportion of females in the group [27]. These conditions can be considered the essence of dialogue in the whole systems approach. We could add to the model the characteristics of

participants, like their degrees of social sensitivity, as latent variables. The proportion of females can be considered a parameter of a kind of diversity. Data on the extent of turn taking can be extracted from our data and examined.

As for the turn-taking analysis, Jayagopi et al. focus not only on turn-taking of the interactions in a small group but also on invisible looking behavior patterns in detail. They addressed the task of mining typical behavioral patterns from small group face-to-face interactions and linking them to social-psychological group variables. Their study shows multiple significant connections between nonverbal features and variables characterizing the group composition, interpersonal perception, and performance [15]. Even though we focus on individual non-verbal behavior shown in Table 2, further research should include non-verbal interactions among participants and its social-psychological effects.

## 8. Conclusion

In this paper, we conducted a case study using World Café as a method of collective dialogue method and examined the mechanism from four measurement points. The result indicates that the more active a participant's quantitative dialogue process is, the more positively the participant feels about the quality of that process and the more action the participant takes. More case studies are needed using different variables to measure individual characteristics, diversity in a group, and interaction patterns in a group. Even though this paper focused on individual data, future research must conduct analyses of dialogues at tables, the use of social networks, human relationships distributed across each table, and changes in the World Café setting.

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## References

- [1] Axelrod, D.: Getting everyone involved: How one organization involved its employees, supervisors, and managers in redesigning the organization, *The Journal of Applied Behavioural Science*, Vol.28, No.4, pp.499–509 (1992).
- [2] Adams, C. and Adams, W.A.: *Collaborating for Change: The Whole Systems Approach*, Berrett-Koehler (2000).
- [3] Bartunek, J.M., Balogun, J. and Do, B.: Considering Planned Change Anew: Stretching Large Group Interventions Strategically, Emotionally, and Meaningfully, *The Academy of Management Annals*, Vol.5, No.1 (2011).
- [4] Bohm, D.: *On Dialogue*, Routledge (1997).
- [5] Bollen, K.A. and Long, S.J.: *Testing Structural Equation Models*, SAGE Focus Edition, Vol.154 (1993).
- [6] Bradbury, H.: Sustaining inner and outer worlds: A whole-systems approach to developing sustainable business practices in management, *Journal of Management Education*, Vol.27, No.2, pp.172–187 (2003).
- [7] Brown, J. and Isaacs, D.: *World Café Community, The World Café: Shaping our Futures through Conversations that Matter*, Berrett-Koehler (2005).
- [8] Bunker, B.B. and Alban, B.T.: Introduction to the special issue on large group interventions, *Journal of Applied Behavioural Science*, Vol.41, No.9, pp.9–14 (2005).
- [9] Briskin, A., Erickson, S., Ott, J. and Callanan, T.: *The Power of Collective Wisdom and the Trap of Collective Folly*, Berrett-Koehler (2009).
- [10] DiMicco, J., Hollenbach, K.J., Pandolfo, A. and Bender, W.: The impact of increased awareness while face-to-face, *Human Computer In-*

- teraction, Vol.22, No.1-2, pp.47–96 (2007).
- [11] Fullarton, C. and Palermo, J.: Evaluation of a large group method in an educational institution: The world café versus large group facilitation, *Australasian Association for Institutional Research Journal*, Vol.14, No.1 (2008).
  - [12] Garcia, S.K.: Developing social network propositions to explain large-group intervention theory and practice, *Advances in Developing Human Resources*, Vol.9, pp.341–358 (2007).
  - [13] Grubbs, J.W.: Participation and change: Using large group intervention methods to inform reflective practice in a community of public organizations, *Public Organization Review: A Global Journal*, Vol.2, pp.285–303 (2002).
  - [14] Isaacs, W.: Dialogue, collective thinking, and organizational learning, *Organizational Dynamics*, Vol.22, No.2, pp.24–39 (1993).
  - [15] Jayagopi, D., Sanchez-Cortes, D., Otsuka, K., Yamato, J. and Gatica-Perez, D.: Linking speaking and looking behavior patterns with group composition, perception, and performance, *Proc. ACM International Conference on Multimodal Interaction*, New York, NY, pp.433–440 (2012).
  - [16] Kim, D.H.: *Organizing for Learning: Strategies for Knowledge Creation and Enduring Change*, Pegasus Communications (2001).
  - [17] Kim, T., Chang, A., Holland, L. and Pentland, A.: Meeting Mediator: Enhancing Group Collaboration and Leadership with Sociometric Feedback, *Proc. ACM Conference on Computer Supported Cooperative Work*, San Diego, CA (2008).
  - [18] Scharmer, C.O.: *Theory U: Leading from the Future as It Emerges*, Berrett-Koehler (2009).
  - [19] Owen, H.: *Open Space Technology: A User's Guide*, Berrett-Koehler (1997).
  - [20] Page, S.E.: *The Difference: How the Power of Diversity Creates Better Groups, Firms*, Princeton University Press (2007).
  - [21] Polanyi, M.F.D.: Communicative action in practice: Future search and the pursuit of an open, critical and non-coercive large-group process, *Systems Research and Behavioral Science*, Vol.19, pp.357–366 (2002).
  - [22] Sawyer, R.K.: *Group Genius: The Creative Power of Collaboration*, Basic Books (2007).
  - [23] Tsoukas, H.: A dialogical approach to the creation of new knowledge in organizations, *Organization Science*, Vol.20, No.6, pp.941–957 (2009).
  - [24] Weisbord, M. and Janoff, S.: *Future Search: Getting the Whole System in the Room for Vision, Commitment, and Action*, Berrett-Koehler (1995).
  - [25] White, L.: Large group methods and the process of operational research, *The Journal of the Operational Research Society*, Vol.53, No.2, pp.149–160 (2002).
  - [26] Whitney, D.: Trosten-Bloom, A., *The Power of Appreciative Inquiry*, Berrett-Koehler (2003).
  - [27] Woolley, A.W., Chabris, C.F., Pentland, A., Hashmi, N. and Malone, T.W.: Evidence of a collective intelligence factor in the performance of human groups, *Science*, Vol.330, No.6004, pp.686–688 (2010).

### Editor's Recommendation

The initial version of this paper was reviewed by three reviewers and has received a best paper award. The authors quantitatively and qualitatively demonstrated better dialogue process by using the World Café as a collective dialogue method. The findings can be useful for practitioners and researchers to develop a facilitation method or supporting system in next generation collaboration technologies.

(Chairman of SIGGN Takaya Yuizono)



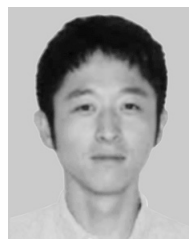
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