

STUDY OF EFFICIENT TEAM ACTIVITIES BY FACILITATOR PARTICIPATION IN VE PROJECT

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Biographies



Atsunori Someya finished the graduate school of Tokyo Metropolitan University, specializing in civil engineering. He joined Oriental Consultants Co., Ltd. in 2005, where he was engaged in planning and design of bridges. He then moved to Metropolitan Expressway Co., Ltd. in 2009, where he has been engaged in construction of expressways, design, execution and maintenance of reconstruction projects. He was certified as VES, or VE Specialist, by the SJVE, or the Society of Japanese Value Engineering, in 2015. Currently, he is the chief of the Project Design Section, Project Department of West Tokyo Bureau, while concurrently serving as VE instructor to support in-house VE projects.



Manabu Sawaguchi graduated from KEIO University, Faculty of Technology, Department of Mathematical Engineering and got a position as a researcher at the SANNO Institute of Management in 1985. As a visiting researcher, he visited University of Michigan IOE (Industrial and Operations Engineering) in 1997. After that, he earned a doctoral degree in Engineering at WASEDA University in 2005. He had worked 30 years of experience in practical technology management. And, now, he is an advisor of SJVE, a vice Chairman of JTS (Japan TRIZ Society), a director of Value Innovation Institute Co., Ltd., a professor at RITSUMEIKAN University and an invited researcher at WASEDA University.

Abstract

An important skill required for VE team leaders is capability for facilitation. According to the principle of team design, this capability is regarded as an essential skill in promoting interactions among members and bringing out their wisdom and knowledge.

VE team leaders are required to play a wide variety of roles with superior capability and skills. According to the authors' opinion, however, it is extremely hard to find someone who can play diverse roles, and therefore, it is difficult to request everything of the VE team leader. Authors are also of the opinion that, functions and roles of VE activities should be separated, as suggested by the principle of team design, i.e. "It is better to utilize 1,000 excellent people rather than 'one wise person'".

Based on the experience of Someya, one of the authors, of serving as in-house VE instructor as well as facilitator in VE team activities, a study was conducted in order to define functions and roles of VE team leader and facilitator as well as to verify the effectiveness of separating them. Based on the result of the study, authors propose in this paper an efficient way of operating VE project team activities by means of involving facilitator separately from the team leader.

1. Introduction

A VE team leader is the person responsible for operating the VE efficiently. For this reason, a leader is required to encourage every member to exercise his/her expertise and interact with the team in a mutually helpful manner. The team activity for a VE project involves collaborative efforts made by all the members with challenging spirit, and it is the leader that occupies the central position and leads the team. The VE team leader is expected to instruct the members to develop strong awareness of achieving the goal.¹ For this purpose, the VE team leader is required to have not only experience/knowledge but also team leadership skills, and the team leader's role is very important and diverse. Thus the burden on the VE team leader is very heavy. Of all the VE team leader's requirements, facilitation skill is most important. This skill is considered an indispensable and essential skill for encouraging interactions among members and bringing out their wisdom on the principle of team design, and its necessity is mentioned in the existing literature.^{2,3,4,5}

However, as mentioned in the abstract, authors think it is extremely hard to find someone with high skills who can play diverse roles, and therefore, it is difficult to request everything of the VE team leader. Based on the principle of team design, i.e. "It is better to utilize 1,000 excellent people rather than 'one wise person'⁶, it is also the authors' opinion that necessary functions and roles should be separated.

Based on the experience of Someya, one of the authors, of serving as in-house VE instructor as well as facilitator in VE team activities in the Metropolitan Expressway Co., Ltd. (hereafter referred to as 'the company'), a study was conducted in order to define functions and roles of VE team leader and facilitator as well as to verify the effectiveness of separating them. Based on the result of the study, authors propose in this paper an efficient way of operating VE project team activities by means of involving facilitator separately from the team leader.

2. VE Project Implementation Framework in Our Company

2.1 Background/Aim of Introducing VE

The company has been actively implementing and utilizing VE since FY 2002, as a powerful measure to increase the efficiency of cost reduction regarding construction and maintenance of expressways. The VE based cost reduction itself is not the aim, but the company regards it as a measure for realizing enhanced services for customers through low tolling, improved functions, and safety, while expecting mainly the following effects through the promotion of VE: (1) minimized lifecycle cost in the construction and maintenance of the Metropolitan Expressways; (2) fostering of the corporate culture of routinely tackling cost improvements and the cost awareness of employees; (3) The enhanced professional technical capabilities, team management abilities and business improvement abilities; (4) mutual enlightenment between employees, and passing technology on to coming generations through participation in small group activities.

Incidentally, VE activities of the company are positioned as a small group activity in which technical employees take initiative in starting up cross-functional VE projects for conducting VE study intensively in a short period.

2.2 Path of VE Activities

The company has been making efforts to introduce VE and make it as part of corporate culture through the implementation of VE training (VE basic training, VE manager training, and VE practical training) mainly for technical employees since FY 2002. From FY 2005, while implementing VE by choosing practical challenges as themes in each Construction and Operation Bureau, an organization was set up for supporting and promoting the VE activities in each Bureau, and development of leading personnel and the promotion of VE activities started on a company-wide basis. Starting in FY 2008, a VE team came to be organized for each VE project to actively conduct VE activities as part of daily work, while establishing the VE instructor system for supporting team activities. Since FY 2011, dissemination of VE has been promoted through expansion of in-house management of VE activities by cultivating VE instructors, encouragement of acquisition of VE related qualifications, and participation in SJVE Conferences.

2.3 Framework for Promotion of VE

The company's VE promotion setup consists of a committee organized by representatives of different sections. A VE project is formed for each study theme, and in consideration of the balance between sections, job types, and years of experience, a VE Team is organized by appointing around six to eight members from across organization. The "Leader" or "Subleader" of a VE team (desirably both, or at least either of them) should have experience in VE or VE practical training. Furthermore, a VE instructor is arranged for each VE project to provide technical support. Additionally, for gaining the latest knowledge and outside information, arrangement is made with an external consultant (external VE specialist) to obtain his support (Fig. 1). Around 10 VE projects, each by one team, are implemented in a year in the company.

VE instructors of the company are made available for supporting VE projects. Their main roles are: a) to give advice on VE theme selection; b) to give advice on VE team member selection; c) to supplement the VE professional knowledge; d) to provide the relevant VE techniques; e) to provide updated VE knowledge; f) to pass on VE knowledge.

Fig. 2 shows a functional diagram based on the main roles of the VE instructor with the definitions of the functions. The VE instructor has the role to start up a VE project, to support the technical aspect in the team activities, and to ensure that the professional VE technologies take root within the company.

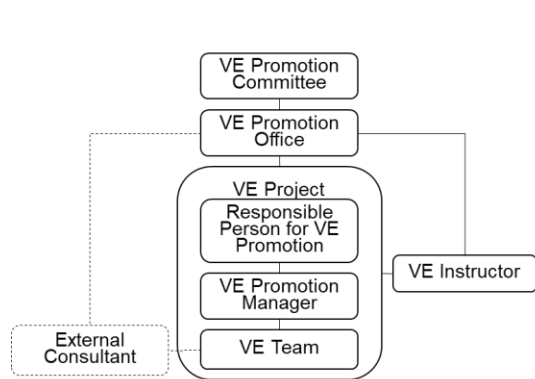


Fig. 1 Organizational Setup of the Company

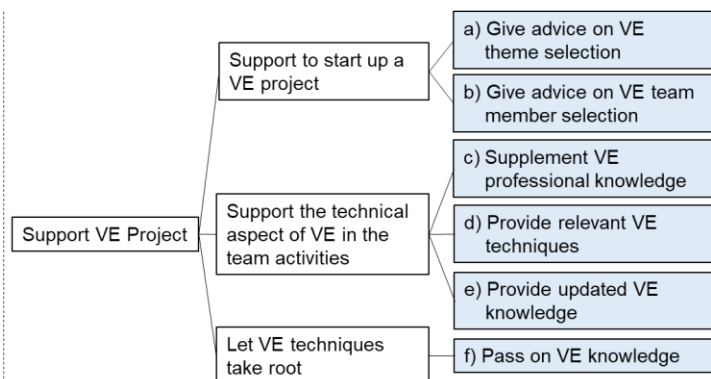


Fig. 2 Functional Diagram of VE Instructor

3. Main Factors that Obstruct VE Project Team Activities and Countermeasures

3.1 Main Factors which Obstruct Team Activities

Team activities hold the key to the success of a VE project. The team members are asked to efficiently carry out the team activities toward the goal along with the daily work within a limited timeframe, but it is difficult to efficiently proceed with a practical team activity. Based on Someya's experience in supporting team activities as a VE instructor as well as on the knowledge acquired from other VE instructors, major factors that obstruct team activities of the VE project are listed in Table 1. The "10 Roles of the VE Team Leader,"^{1,2} leads authors to realize that many of the factors that obstruct team activities are attributable to the VE team leader. A VE team leader is expected to eliminate these factors and promote streamlining of team activities.

3.2 Countermeasures to Major Factors that Obstruct Team Activities

As mentioned previously, major factors that obstruct team activities are attributable to the VE team leader. In other words, if the VE team leader clearly understands his/her roles and functions properly, most of obstructing factors will be eliminated, leading to efficient team activities. However, an ideal VE team leader who can eliminate all the factors scarcely exists, and it is difficult to request everything of one VE team leader.

Some obstructing factors are related to the facilitation skill, such as insufficient VE knowledge or experience as a VE team leader or lack of capability to bring out active opinions from the members.

Hence, an idea arose to appoint a VE instructor, who has been providing technical support in the current team activity, as facilitator. As a result, it was decided to carry out a trial, that is, to let a VE instructor, who has been providing technical support to a VE team, to participate in team activities also as facilitator, while clarifying functions and roles of VE team leaders and facilitators, in order to prove that division of roles may eliminate causes hampering team activities. (Fig. 3).

Meanwhile, facilitator was given a neutral position not to take sides with any particular opinion of the team, so that he/she may keep objective and comprehensive viewpoint as he/she contacts with the team, so that the team may maintain its initiative.

Table 1 Major Factors which Obstruct Team Activities

No	Factors that Prevent Team Activities	Attributable to	Remarks
1	The team leader does not understand the role.	Team leader	The team leader should understand the role.
2	Not enough leadership from team leader.	Leadership of team leader	The team leader should understand the role.
3	Insufficient advance preparation by the team leader.	Team leader	The advance preparation of team activities by the team leader should be sufficient and efficiently operated.
4	Shortage of VE knowledge or experience of team leader.	The instruction skills of team leader	The team leader should upgrade the VE knowledge or experience.
5	Poor management of time.	Team leader	Schedule and time should be properly controlled by the team leader.
6	Poor role sharing.	Leadership of team leader	The team leader should coordinate the roll sharing.
7	Sometimes the goal of the team activity is unclear or the goal is lost midway.	Leadership of team leader	The team leader should clarify the goal and control toward the goal.
8	Shortage of VE knowledge or experience of team members.	Team members	The members should upgrade their VE knowledge or experience.
9	Many absences or tardiness by members.	Leadership of team leader	The team leader should encourage attendance and punctuality.
10	Lack of motivation to challenge difficulties such as making a big change on existing systems.	Leadership of team leader	The team leader should encourage and increase the motivation.
11	Strong feeling of being forced to carry out VE and no action is made with an independent mind.	Leadership of team leader	The team leader should encourage and increase the motivation.
12	The complicated (hierarchical, etc.) relationships of the team make it difficult to voice an opinion.	The facilitation skills of team leader	The team leader should coordinate an atmosphere where members feel comfortable voicing their opinions.
13	The consciousness of interests prevents constructive talk.	The facilitation skills of team leader	The team leader should coordinate an atmosphere where members feel comfortable voicing their opinions
14	Not enough extraction of constructive opinions and ideas from the members.	The facilitation skills of team leader	The team leader should coordinate an atmosphere where members feel comfortable voicing their opinions.
15	The argument involves only some of the members or the leader.	The facilitation skills of team leader	The team leader should coordinate an atmosphere where members feel comfortable voicing their opinions.
16	Drifted into a wrong or biased evaluation by a personal opinion.	The instruction skills of team leader	The team leader should evaluate using the proper evaluation methodology.

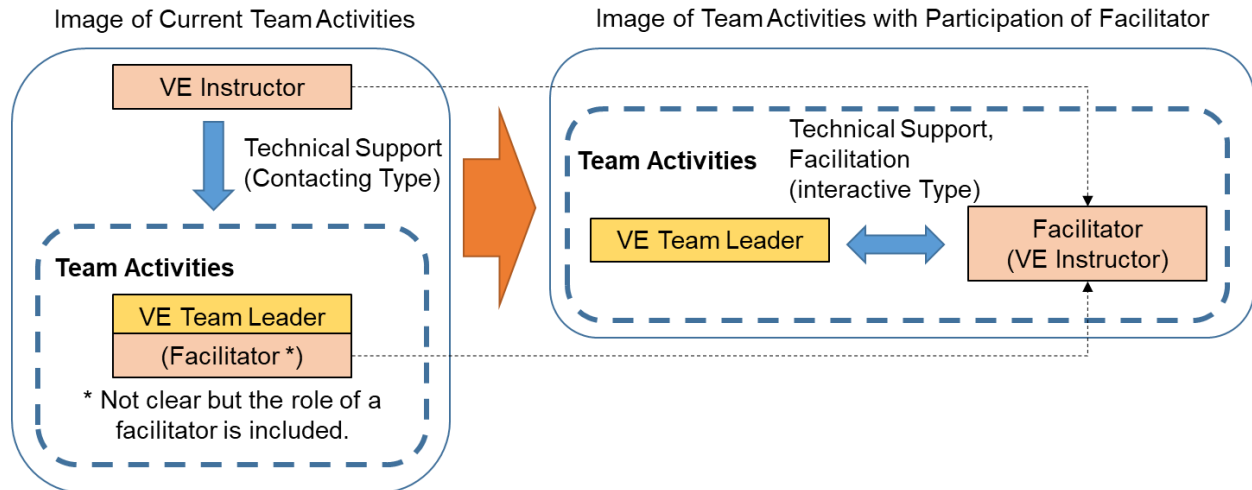


Fig. 3 Images of Current Team Activities and Team Activities with Participation by a Facilitator

4. Roles of VE Team Leader and Facilitator, and Functional Analysis

Here, for the purpose of clarifying functions and roles of the VE team leader and the facilitator, a functional analysis was conducted based on the generally defined roles of the VE team leader and the facilitator.

4.1 Roles of VE Team Leader and Functional Analysis

4.1.1 Roles of VE Team Leader

A VE team is a group of persons who have professional knowledge. The role of the leader is to bring out technologies, experiences, and knowledge of the members and to exercise leadership to promote their activities, while creating an atmosphere in which each member can express one's own opinions without reservation, filled with mutual respect and satisfaction of belonging to the team.

The roles of the leader for the purpose of promoting an activity toward a goal by integrating technologies, experiences, and knowledge of the members are defined as follows in the "10 Roles of the VE Team Leader"^{1,2}: (1) To create job plan and schedule; (2) To check and record attendance; (3)-1 To motivate team members; (3)-2 To clarify problems; (4) To integrate the team member's will; (5) To coordinate and chair various meetings; (6) To record the required time for various meetings; (7) To promote the VE job plan and control the implementation; (8) To check the progress and control the promotion and implementation; (9) To coordinate the team activities in various meetings; (10) To make an effort to enhance teamwork

4.1.2 Functional Analysis of VE Team Leader

Based on the "10 Roles of the VE Team Leader,"^{1,2} relevant functions were defined and a functional diagram was created (Fig. 4). The VE team leader has the role to enhance the efficiency of team activities, increase the motivation of team members, and conduct decision-making toward the goal of the team activity while showing the direction of the activity and keeping the schedule.

4.2 Roles of Facilitator and Functional Analysis

4.2.1 Roles of Facilitator

Facilitation is, in a word, a function to facilitate intellectual interactions within a group. More specifically, "it is to support a team to maximize achievements of the team by controlling the process, and inducing teamwork in a neutral position"⁷ and it is the facilitator that plays that role.

A VE team is set up with experts from different areas with diverse technology, experience and knowledge necessary to study a selected theme. Generally the way how each member acts in any team activity is classified into five types^{1,6}: contact type; disconnection type; absorption type; following the crowd type; and interactive type. The interactive type is regarded as the most desirable type. The interactive type is where

participating members with their expertise in respective fields will actively express their opinions making the most of their technologies, experience, and knowledge to enhance synergy, and it is only when each of the members is participating with this type that merits of team design are displayed. That is to say, the role of the facilitator who acts to stimulate intellectual interaction can contribute significantly to team design.

The main roles^{7,8} of a facilitator are defined as: A) to support an activity in a neutral position; B) to thoroughly use the basic processes VE action plan; C) to keep the thread of conversations and extend; D) To deepen the conversation by asking questions; E) to create a positive feeling by attentive listening; F) to make others correctly understand the point; G) to structure the argument; H) to clarify the point and the positioning; I) to address consensus building; J) to resolve conflicts in a harmonious way; K) to protect members from being attacked by others because of their opinions.

4.2.2 Functional Analysis of Facilitator

The functional diagram drawn up with the definition of functions based on the main roles of facilitator is shown in Fig. 5. The facilitator has a function to promote the intellectual interaction of the group by arranging the forum for the team activity, bringing out opinions from the team, coordinating opinions of the team, and encouraging decision-making.

5. Clarification of Functions/Roles of VE Team Leader and Facilitator

5.1 Organizing Functions of VE Team Leader and Facilitator

Here, functional diagrams are integrated and organized for clarification of the functions and roles of the VE team leader and the facilitator. The integrated result of functional diagrams of the VE team leader and that of the facilitator is shown in Fig. 6. Published literature^{2,3,4,5} emphasize importance of facilitation as a requirement for VE team leaders, and the reason for the necessity can be explained using this functional diagram. The reason is to promote the intellectual interaction of team activities and efficiently carry out the decision-making process toward the goal of the team. Eventually, this is regarded as the functions and roles of an ideal VE team leader. However, it is also recognizable that becoming the VE team leader having all the functions and roles is burdensome and very difficult. It is also true that all the functions and roles do not have to be requested of the VE team leader but sharing would be possible.

5.2 Clarification of Functions and Roles

As mentioned previously, it is practically difficult for a VE team leader to fulfill all the roles. Although there has been understanding about necessity of facilitation skill, it has not been clearly defined. Based on the results of the functional analysis this time, the roles of the VE team leader and the facilitator to promote the intellectual interaction of team activities and efficiently carry out the decision-making process toward the goal of the team are shown in Table 2 and Table 3. Incidentally, “to support the technical aspect of VE in the team activities”, which is a role of VE instructor relevant to team activities as shown in Fig.2, is added to the role of facilitator, while leaving the other roles to remain as roles specific to the instructor.

6. Effect of Participation of Facilitator in Team Activities

6.1 Verification of Effectiveness of Facilitator Participating in Team Activities

A questionnaire-based survey was conducted on two teams in which Someya participated as facilitator, in order to verify the effectiveness of involvement of facilitator based on aforementioned role sharing. The respondents were the VE team leaders (two persons) and team members (seven persons) for a total of nine persons. The questions (12 items) and the questionnaire results are shown in Fig. 7.

Results of the survey showed that two VE team leaders affirmed high effectiveness in all the questions. Likewise, team members expressed affirmation, verifying the effectiveness of involvement of facilitator in team activities.

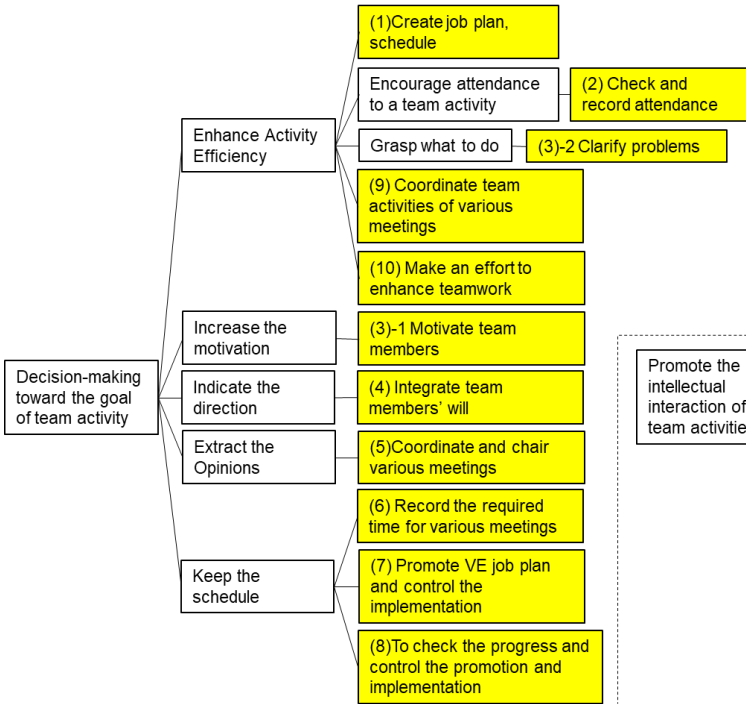


Fig. 4 Functional Diagram of VE Team Leader

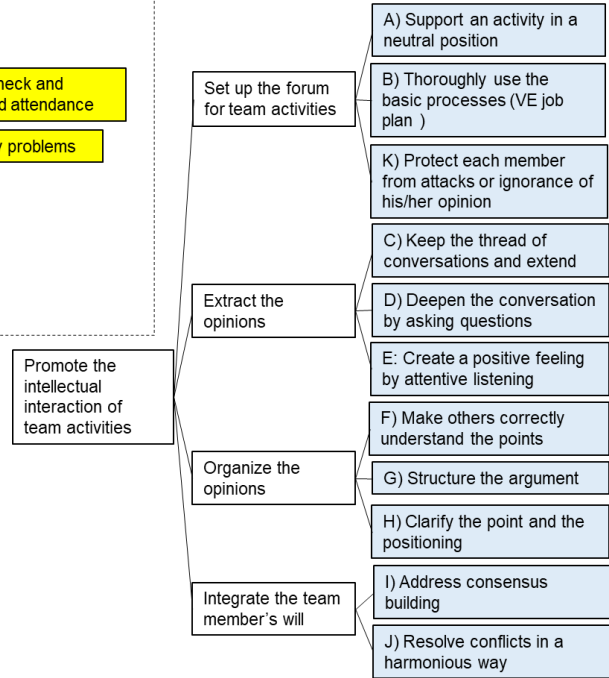


Fig. 5 Functional Diagram of Facilitator

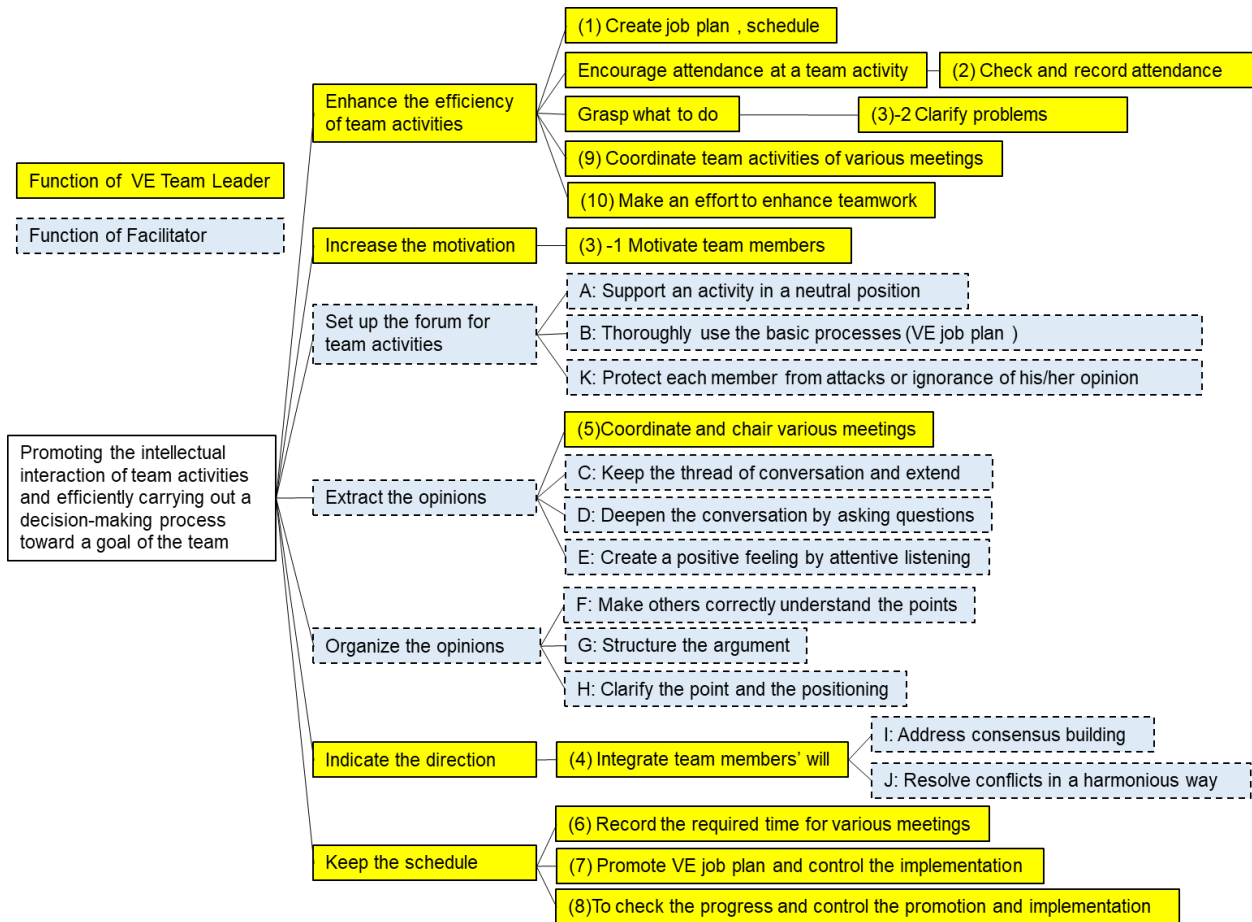


Fig. 6 Integrated Functional Diagram of VE Team Leader and Facilitator

Table 2 Roles of VE Team Leader

Upper Level Functions (Roles)	Lower Level Functions (Roles)
(1) Enhance the efficiency of team activities	(1) Create job plan, schedule (2) Check and record attendance (3) Coordinate the team activities of various meetings (4) Make an effort to enhance teamwork
(2) Increase the motivation	(5) Motivate team members and clarify the problems
(3) Indicate the direction	(6) Integrate team members' will
(4) Keep the schedule	(7) Record the required time for various meetings (8) Promote the VE job plan and control the implementation (9) Check the progress and implement a countermeasure for any delay

Table 3 Roles of Facilitator (The roles of the VE instructor of the company are added.)

Upper Level Functions (Roles)	Lower Level Functions (Roles)
(1) Support the technical aspect of VE in the team activities (The roles of VE Instructor of the company)	(1) Supplement VE professional knowledge (2) Provide the relevant VE techniques (3) Provide the updated VE knowledge
(2) Set up the forum for team activities	(4) Support an activity in a neutral position (5) Thoroughly use the basic processes (VE job plan) (6) Protect a member from attacks or ignorance of his/her opinion
(3) Extract the opinions	(7) Coordinate and act as a host of various meetings (8) Keep the thread of conversation and extend (9) Deepen the conversation by questioning (10) Create a positive feeling with attentive listening
(4) Organize the opinions	(11) Make others correctly understand the points (12) Structure the argument (13) Clarify the point and the positioning
(5) Integrate the will (Support for "integrating the team members' will" by a VE team leader)	(14) Address a consensus building (15) Resolve conflicts in a harmonious way

Absolutely
 Yes
 Yes and No
 No
 Definitely No

- (1) The roles of team leader (members) have been clarified. (The roles were shared)
- (2) The lack of basic VE knowledge or experience as a team leader (members) was supplemented.
- (3) Now the advance preparation time is secured for an activity as a team leader (members).
- (4) Members started giving opinions in a well-balanced manner.
- (5) The organized opinions in a team activity provide ease of understanding.
- (6) The organized opinions in a team activity provide ease of decision-making.
- (7) Facilitator put the team back on the right track when it was heading towards a wrong direction.
- (8) Objective opinions helped when members were at a loss.
- (9) The orientation of activity was presented when pondering over a decision.
- (10) The pressure was relieved by the sense of security over team activities.
- (11) The work burden for team activities was reduced.
- (12) The efficiency was generally increased.

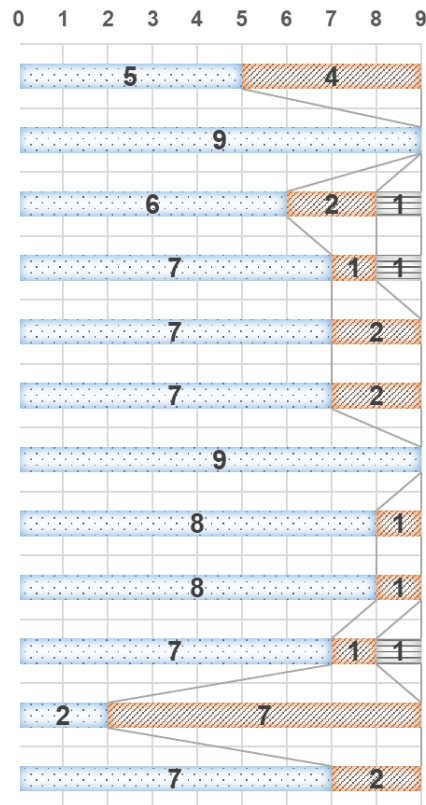


Fig. 7 Questionnaire Results

In addition, consideration was given to causes obstructing team activities mentioned in “3.1 Main Factors which Obstruct Team Activities” while referring to the result of the survey, which showed that nine out of sixteen factors (56%) (No. 1, 3, 4, 6, 8, 12, 13, 14, and 15) were relevant, proving that participation of a facilitator showed high effectiveness and that many obstructing factors were eliminated. Furthermore, the remaining seven items (44%) (No. 2, 5, 7, 9, 10, 11, and 16) were attributable to the roles of the VE team leader; and therefore, it was proven that the number of obstructing factors which should be eliminated by the VE team leader was greatly reduced by participation of facilitator.

It can be concluded, therefore, that the participation of a facilitator will reduce the burden of the VE team leader and will enhance the total efficiency of team activities.

6.2 Advantages in Organizational Activities

While, in principle, every technical employee of the company undergoes VE basic training, not all employees are routinely participating in VE projects. Since participation in a VE project depends on the timing, not all the employees are necessarily rich in knowledge and experience. Such a case may inevitably occur where the team members lack in relevant knowledge and experience. In such a situation, participation of a facilitator with technical support capability will enable efficient operation of VE activity in supplementing members' capability. Facilitator offers a major advantage in organizational activity of the company.

6.3 Challenges of Participation of Facilitator in Team Activities and Countermeasures

As mentioned previously, it was confirmed that the participation of a VE instructor in team activities as a facilitator is very effective. However, the number of human resources who understand functions and roles of facilitator and can properly function is currently very limited, and therefore, it is a challenge to develop facilitation capability in VE instructors. For this purpose, education is to be given to enhance facilitation capability of VE instructors. It should also be noted that, when Someya participated in a project as a facilitator, there was a conflict between roles of facilitator and those of team leader, causing team members to mix up facilitator and team leader, to the extent of asking the facilitator to show direction or make decisions. As a countermeasure, it is important for the members of team activities to move forward with the team activities after thoroughly understanding the roles of the team leader and facilitator.

7. Conclusion

This paper proposes an efficient way of operating VE activity based on a study. The study involved assigning a facilitator, separately from a VE team leader, based on Someya's experience of serving as VE instructor as well as facilitator in VE team activities in the company. The result showed significant improvement in the efficiency of VE project team activity. Facilitation is an important skill for promoting intellectual interactions in team activities and should be acquired by team leaders. It was discovered, however, that it is not necessary for a VE team leader to have such skill along with all the functions and roles, and that efficiency can be improved by dividing functions and roles among different people. Based on the study, plan is now under way for establishing a system in which facilitator gets involved in the company's future VE project team activities. The company, having started up and conducted around 100 VE projects during the period from 2002 to 2015 through team activities, was awarded the Miles Award Special Award in 2011 in recognition of their efforts. The company intends to go on improving the activity without letting VE activity to become a mere name without substance. Authors think that team activity with participation of facilitator is conducive to increasing efficiency of team activities irrespective of the size of the company or organizational setup, on condition that division of roles between facilitators and VE team leaders is made clear. It is of utmost happiness of the authors, if the result of the study described in this paper would be of some help to the enhancement of efficiency of VE activity in other companies.

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