Title	"Project-based Collective On-the-Job Training" Methodology using Soft Systems Methodology
Author(s)	Chujo, Hisako; Kijima, Kyoichi
Citation	
Issue Date	2005-11
Type	Conference Paper
Text version	publisher
URL	http://hdl.handle.net/10119/3814
Rights	2005 JAIST Press
Description	The original publication is available at JAIST Press http://www.jaist.ac.jp/library/jaist-press/index.html, IFSR 2005 : Proceedings of the First World Congress of the International Federation for Systems Research : The New Roles of Systems Sciences For a Knowledge-based Society : Nov. 14-17, 2024, Kobe, Japan, Symposium 2, Session 2 : Creation of Agent-Based Social Systems Sciences Management Systems

"Project-based Collective On-the-Job Training" Methodology using Soft Systems Methodology

Hisako Chujo and Kyoichi Kijima
Graduate School of Decision Science and Technology, Tokyo Institute of Technology
2-12-1 Ookayama, Meguro-ku, Tokyo 152-8552, Japan
chujo@valdes.titech.ac.jp
kijima@valdes.titech.ac.jp

ABSTRACT

The purpose of this paper is to propose, implement and evaluate a methodology called "Project-based Collective On-the-Job Training (OJT)" that incorporates Off the Job Training (OFF-JT) and Soft Systems Methodology (SSM). Our new methodology of adult education is based on our long experience in that field, and the methodology overcomes various problems of the conventional OJT. The essence of "Project-based Collective OJT" is the usage of the participant's on-site practice process as a collective OJT in an open seminar.

Keywords: Project-based, Collective OJT, Learning, SSM, on-site practice

1. INTRODUCTION

In the paper, we focus on the adult education systems where we may apply our original educational methodology. We explain the adult education system and identify the gap between the reality and the idea of OJT in the introduction, which motivate us to propose the new methodology.

1.1 Adult Education Systems

In the field of adult education in Japan, most of interested parties perceive OFF-JT, OJT and correspondence courses as the three principal methods of adult education (see Fig.1).
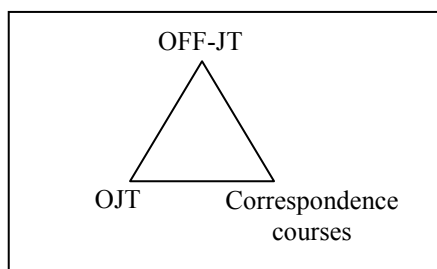

Fig. 1 Three principal methods of adult education

OFF-JT is an educational training in a classroom at remote location by a professional instructor. In contrast, OJT is an educational training at a workplace by a senior associate or manager usually without educational profession (Terasawa [1]). The correspondence courses are the self-paced learning using some textbooks, tests and e-learning.

Particularly, many organizations see OJT as the primary method of employee training, since they can implement OJT with less financial resources than that of OFF-JT. However, the following problems are very common with OJT (Works Institute [2]):

(1) Since most educational departments relegate OJT practices to each division, they cannot see exactly how each division actually practice their OJT.

(2) In the organizations without established evaluation systems for checking the performance of OJT closely, we often observe the following symptoms (Works Institute [2]): "The managers put OJT practices on ice", "The instructions by senior workers or manager are irresponsible" and "The managers do not evaluate the performance of each OJT practice".

(3) OJT coaches implement OJT on one-on-one basis, so that there is a limitation on the number of OJT trainees that one coach can look after.

(4) OJT does not link with OFF-JT or correspondence courses, and the contents of OJT depend on the knowledge and coaching skill of the coach.

In addition to the problems mentioned above, the traditional principal methods only focus on the individual learning. As a result, insufficient light has been shed on collective learning, though interests in it have increased in the field of organizational learning.

1.2 Gap between the reality and ideal of OJT

In the conventional OJT, one OJT coach often teaches one trainee at a time according to general coaching method (see Fig. 2). However, the organizations generally have only a few coaches in their workplaces so that there is a limitation on the number of employees
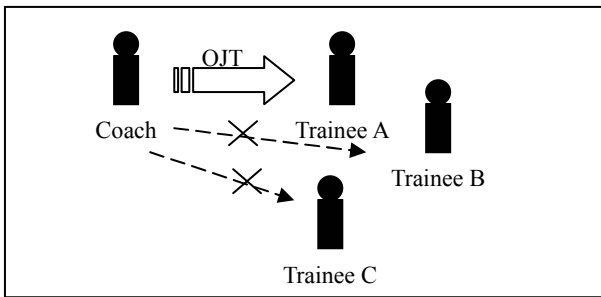
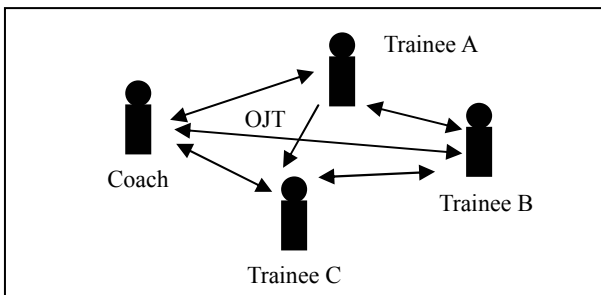Fig. 2   Real OJT: One coach to One trainee

Fig. 3   Ideal OJT: One coach to plural trainees

who can have the educational opportunities. Therefore, if it is possible to increase the number of trainees any way, it may bring certain advantages to the organization. We believe that "Project-based Collective OJT" we will introduce in the next section may realize the ideal of OJT in the organizations (see Fig. 3).

1.3 The paper plan

The paper proceeds as follows: In the next section, we describe our new concept of OJT named "Project-based Collective OJT". In section 3, we explain the core of "Project-based Collective OJT". Then we evaluate the effectiveness of "Project-based Collective OJT" based on our practice. Finally, we conclude the paper.

2. CONCEPT OF "PROJECT-BASED COLLECTIVE OJT"

In this section, we will show the concept of our new methodology -- "Project-based Collective OJT". We have developed the methodology based on the reflections of adult education practice as an open seminar that Chujo carried out in 2004. It is a new training style of OJT applying "Action Education by Project (AEP)" (Chujo and Kijima [3] [4]).

2.1 AEP

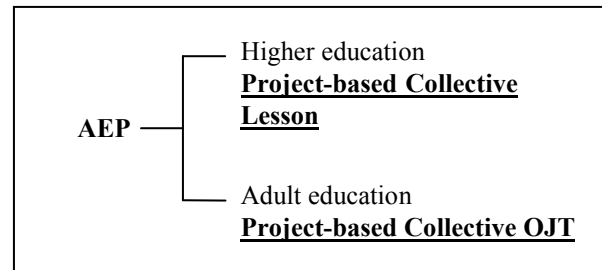AEP is a new comprehensive methodology for the

Fig. 4   Education field of AEP

educational program developers and instructors of problem finding and solving educations that we developed (Chujo and Kijima [3] [4]). The purpose of AEP is effective realization of the participative learning and active learning in a problem finding and solving education. Currently, we define two education field of AEP; the higher education and the adult education (see Fig. 4). We call the former "Project-based Collective Lesson" while the latter "Project-based Collective OJT".

Both of them are also a methodology based on the spirits and the techniques of SSM, and have the following characteristics in common: (1) SSM-based materials and interventions by instructor, (2) feedback loop and double loop learning, and (3) Project-based mutual learning.

2.2 Process of "Project-based Collective OJT"

The process of "Project-based Collective OJT" consists of two OFF-JTs and participant's on-site practices (see Fig.5).

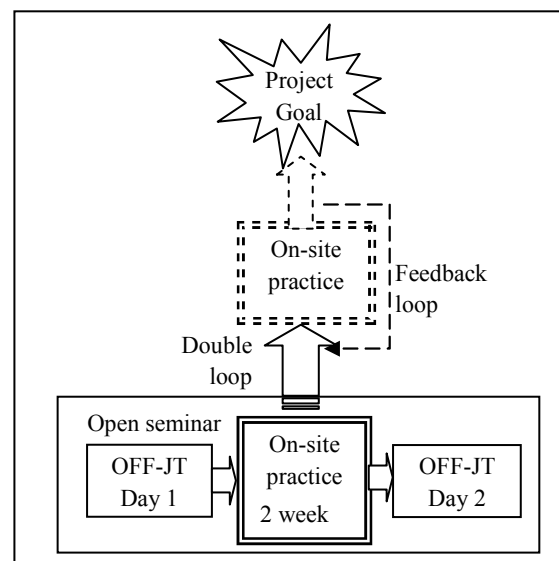**(1)OFF-JT (Day 1):** Instructor holds the first OFF-JT

Fig. 5   Process of "Project-based Collective OJT"

session as an open seminar on Day 1. Its purpose is to teach the participants the methods of "Project-based Collective OJT". Instructor explains the detailed steps of the session through several practices in the classroom. Then the participants get ready for applying the methods to the problem finding and solving process after getting back to their respective workplaces.

(2) **On-site practice (2 weeks):** After Day 1, the participants go back to their respective workplaces. Then, they organize a project with the workplace members and managers to carry out the on-site practice for two weeks until Day 2. In the on-site practice, the participants direct the project members to engage in the issue suggested by the OFF-JT. The issue focuses on problem finding in their respective workplaces. Generally, the problem contexts of the workplaces are not coercive (Jackson [5]), so that the project members are expected to accommodate and create some outcomes (i.e. Rich Picture, current evaluation, problems list) by this on-site practice. Through the on-site practices, even the workplace members and managers who did not attend the open seminar can learn the methods of "Project-based Collective OJT". They have two meetings within two weeks, and they dialogue the problem situation and reveal plural problems in order to discover one issue that they can accommodate. The process of the meetings constitutes the collective learning process; they learn by trial and error, and they understand the methods better.

(3) **OFF-JT (Day 2):** Then, the participants return to attend the second day of OFF-JT on Day 2 with the outcomes of on-site practice. They discuss the outcomes in the group sessions and finally get accommodation with a priority plan for the problem solving. The participants also learn more problem solving methods that are useful for the next On-site practices. The participants will teach them to other project members at their respective workplaces.

(4) **On-site practice:** After that, the participants get back to their respective workplaces with the learning outcomes of Day 2, and continue the on-site practice until achieving the goal of the plan. The priority plan is just a tentative plan as a basis for discussion. The project members continue to discuss the plan and keep doing the on-site practice with the feedback loop until achieving accommodation for their actions. The collective learning of the on-site practice leads to a double loop learning. The members change their

viewpoints and minds, and are motivated for the problem solving. "Project-based Collective OJT" will finish when the members actually finished the priority plan. Now, whenever needed, they can begin new "Project-based Collective OJT" without any OFF-JT, because they have already incorporated the methods of "Project-based Collective OJT".

3. CORE OF "PROJECT-BASED COLLECTIVE OJT"

"Project-based Collective OJT" is unique in the aspects of the process, learning, and materials.

3.1 Never-ending Learning Methodology

The process explained in 2.2 is a single problem finding and solving process in a workplace. However, the problem finding and solving process in a workplace is really like a never-ending spiral. We define the steps of "Project-based Collective OJT" that explain the functions of "Project-based Collective OJT" focused more than one problem finding and solving (See Fig.6).

The participants of the seminar do Steps 1 to Step 4 during the seminar, two-day OFF-JT and 2 weeks on-site practices. Step 5 is an execution of Action plan in each workplace. Step 5 continues until achieving the goal of Action plan.

By the execution of Step 5, the knowledge and skill that the project members have spiral up to upper level. In addition, the recognitions of people will change and they will witness a new problem situation. The feedback loop from Step 5 to Step 2 means a beginning of a new problem finding after solving one problem.
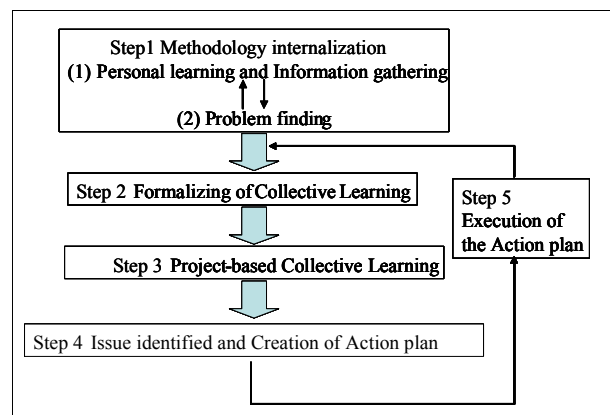

Fig. 6   Steps of "Project-based Collective OJT"

The detail explanations of each step are as follows:

Step 1: Methodology internalization (Day 1)

(1)Personal learning and Information gathering

Each participant of the seminar learns the spirits and methods of "Project-based Collective OJT". They internalize "Project-based Collective OJT" during Day 1. Each participant inquires a lot of information relevant to own problem situation and draws own current problem situation.

(2) Problems finding

Instructor assigns some exercises for problem finding to each participant. Through the exercises, each participant tries to understand the problems in several ways, finds and examines various aspects of them. Due to the mutual learning and effective intervention by instructor, each participant can realize some new viewpoints and incorporate them into each output. Each participant can recognize the merits that can get through the collective thinking, and motivates to the future on-site practices.

The participants come and go between (1) and (2) during Day 1.

Step 2: Formalizing of Collective learning (2 weeks)

At the first meeting of the on-site practice, each participant organizes a project for the problem solving and formalizes the project. This is a necessary ceremony required to perform the on-site practice formally in each workplace. Each participant also transfers his/her own knowledge to the members and manager and motivates them. This is a step required to the success of the on-site practice.

Step 3: Project-based Collective learning (2 weeks)

Each project is carried out by collective learning from the start of the problem solving project to the day before the second Off-JT. Each project comprehends the actual state of the workplace, and clarifies the plural problems faced by them, then examines the priority. Through step 3, the project members learn the importance of collective thinking and accommodation.

Step 4: Issue identification and Creation of Action plan (Day 2)

Each participant identifies one issue based on the project outputs in the 2 weeks on-site practice and create own action plan that will do after the seminar. Each participant re-examines the problems that each project separately examine during the on-site practice to develop plural issues from them. Then they decide the top-priority issue and create an action plan for treating the issue. The process of second Off-JT forms a cycle consisting of the group learning, intervention by instructor and individual reflection. By doing so, the participants understand the advantages of multifaceted thinking.

Step 5: Execution of the Action Plan (After finished the seminar)

Each participant gets back to each workplace and re-examines the action plan created in the second Off-JT with the project members. Then they really implement the action plan. Finally, they evaluate the outcomes of the project activities, and finish "Project-based Collective OJT". If they change their view to the problem situation, it might bring some new problem situations. If so, they select a new leader, and organize a new problem-solving project. It leads to the next learning circle from the step 2 again.

3.2 Purposeful collective learning process

The most important core concept of "Project-based Collective OJT" lies on the purposeful collective learning. Not only the participants of OFF-JT themselves, but also the members and managers of each workplace are involved in the training (see Fig. 7).
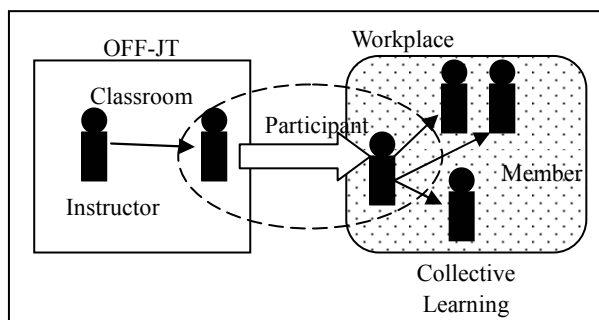

Fig. 7 Purposeful collective learning in "Project-based Collective OJT"

It leads the methodology not to simple individual learning of only the participant of OFF-JT, but to purposeful collective learning by all the relevant persons. Moreover, the participants of OFF-JT transfer the contents of OFF-JT to the members and managers who have not participated in OFF-JT during the process of on-site practice. Thanks to it, the on-site practice thus becomes systemic and collective.

3.3 Materials development based on SSM

In order to realize the steps of "Project-based Collective OJT", instructors have to develop and implement the educational materials. We have confirmed the
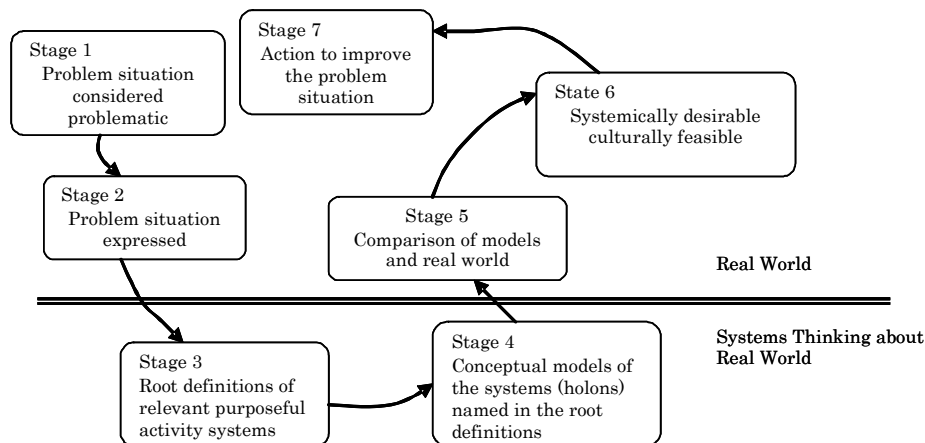
Fig. 8 The conventional seven-stage model of SSM

effectiveness of soft systems approach to the adult education through own long experiences in education and consulting. Hence, we propose an approach for the materials development that refers to the ideas of SSM, one of the well-known soft systems approaches (Checkland and Scholes [6]). Then, SSM plays a basic role in the educational materials: i.e., textbook and worksheets. The conventional seven-stage model of SSM (Fig. 8) shows the inquiring process and the techniques used in each stage. Instructors refer to the spirit (Plural problem thinking) and the three techniques (Rich Picture, Comparison, and Conceptual Models) of SSM.

(1)Plural problems thinking

Instructor asks the participants to continue the plural problems thinking during the seminar and each participant also ask the members to continue the plural problems thinking during the project activities. The plural problem thinking is an important spirit for realizing "Project-based Collective OJT". For this reason, instructor repeats highlighting the plural problems thinking.

(2)Rich Picture (Stage 1)

Instructor explains the drawing method and shows the sample of Rich Picture to the participants. Then the participants draw own Rich Picture by hands in the individual practice. After that, they share and understand each problem situation using Rich Picture within the group. Rich Pictures are the raw materials for the subsequent processes.

(3)Comparison (Stage 5)

Instructor asks the participants to compare the necessary activities in the comparison table with the current situation of each workplace. For implementing the exercise effectively, instructor develops the

comparison table that includes the necessary activities useful for solving the targeted issue. The participants evaluate every activity and describe the reason of each evaluation.

(4)Conceptual models (Stage 4)

After identifying the most important issue, the participants investigate the necessary activities in order to achieve the issue, and draw a conceptual model. The participants examine the logical relations between the activities and build the coherent model. The activities of Conceptual Models are the action items of their action plan.

Because it is hard to implement "Project-based Collective OJT" only with SSM techniques, it is necessary to complement SSM techniques with other methods. In order to make the approach consistent for problem solving, we designed and developed some methods and practices showing in Table 1. This is based on the spirit of multi-methodologies (Mingers [7]). Table 1 clearly shows how instructor combines the spirit and techniques of SSM with other methods (in this case, they are our original methods). Instructor can adopt other methods suitable for own seminar theme instead of our original methods. If instructor designs own process flow for a seminar, instructor has to design carefully the connections between the spirits and techniques of SSM and other methods. Some exercises are necessary to encourage plural problems thinking and collective thinking. Participants proceed with their own problem solving process following the arrows of Table 1.

Instructor has to design and implement the materials both for facilitating the participant's learning in the classroom and for supporting the participants to manage the on-site practice process independently. Instructor

Table 1 Combination with the spirit and techniques of SSM and other methods

Time	Spirit and techniques of SSM	Other methods
Off-JT 1, On-site 2 week	Rich Picture	
	Comparison	
	Plural problems thinking	
Off-JT 2		Distinction of the problems
		Reason thinking and prioritization of the problems
		Listing of the potential problems
		Transformation of the problems into issues
		Issue checklist
	Conceptual model	
		Activities requirements
		Group Review
		Creation of own Action plan
		Presentation of the action plan in the class
		Feedback from instructor
On-site practice		Discussion of the action plan within the project
		Execution of the action plan

also has to develop the materials purposefully to be a guideline of On-site practice. If so, participants can manage their project activities of On-site practice using the materials in place of instructor.

In addition, it is important to develop the materials that are useful for the participants without knowledge and skills of SSM. For that reason, instructor embeds the spirit and techniques into the materials without using some technical words of SSM.

4. EVALUATION AND SUPPORT OF "PROJECT-BASED COLLECTIVE OJT"

4.1 Validity of our methodology by practice

To validate our methodology, we employed it for "The seminar(s) for middle managers on the improvement of the skill of practical information usage" at Lifelong Human Resources Development Center (Lifelong Human Resources Development Center [8]). In this section, we will examine the performance intensively.

We held the open seminar in January and February 2004, where Chujo instructed thirteen participants. There were various industry types of the participants, from official business to manufacturing industry, transportation business, and service industry. Almost all the participants were middle manager and some were the candidates of a manager. Chujo divided the members into four groups. In the classroom, they sat down group by group, and they communicated with other group members very much during the Off-JT. Chujo could observe a lot of mutual learning in every group.

The main issue of the seminar is to identify and solve problems relevant to utilizing the information more effectively at each workplace. Chujo employed the original materials for the instruction. The participants could use the worksheets without any troubles. Though it was the first experience for the members to draw the rich pictures, they could manage them smoothly. They seemed to enjoy expressing their perception of their problems by a Rich Picture, and one of the participants made a comment, "Drawing rich pictures is really a fun" with smile. Quality of most of the Rich pictures was great.

The participants got back to conduct "Project-based Collective OJT" with the members and managers of their workplace. The participants organized a project, and started two-week on-site practice autonomously. Since the on-site practices took place at each workplace, it was physically impossible for instructor to intervene on real time basis. Each participant did the project activities without any instructor's real time support, and filled all of the worksheets and presented them.

By re-examining them, we found out most of the on-site two-week practices were successful in two senses. First, the tangible outputs were great. The participants brought the outputs to the second day of Off-JT and re-examined them with another participants. Indeed, we could confirm effectiveness of the approach for the on-site practice. Furthermore, the participants of the seminar appreciated usefulness of the materials. Secondly, there were satisfied with the program, according to the results of the seminar survey. In fact, some of the participants were motivated so much as to continue this kind of "Project-based Collective OJT" even after they have completed the seminar.

4.2 Three advantages of the methodology revealed by the practice

We can claim at least three advantages of the methodology, namely: (1) linkage between OFF-JT and OJT produces complementary effects, (2) the methodology enhances not only individual learning of participant but also the organizational learning involving the members and managers, and (3) the methodology realizes the simultaneous and collective OJT.

(1)Linkage between OFF-JT and OJT

Furthermore, the process of "Project-based Collective OJT" consists of two OFF-JTs and one on-site practice as shown in Fig 5. The idea of the linking OFF-JT with OJT is so new that nobody has implemented the idea before. There is a term "Blended Learning", which is learning which combines e-learning with face-to-face approaches (Allison Rossett, Douglis and Frazee [9]). It is possible to use some e-learning in "Project-based Collective OJT", but it is not a requirement. However, the blending orientation of the "Project-based Collective OJT" has a similar characteristic of the "Blended Learning".

Fig. 9 is a positioning map of the adult learning methods. The horizontal axis represents the place where instructors conduct the adult education. On-site means the workplace including office, plant, and so on while off-site implies off-the-job training space, for example, a classroom of a training facility and/or trainee's house. The vertical axis shows the learning type of adult education. Individual learning means personal learning with only one trainee. On the other hand, the participative collective learning indicates so called plural learning with more than one trainee. Because the conventional Off-JT, correspondence courses and OJT focus on the individual learning, we positioned them above the horizontal axis. In contrast, the project-based collective OJT is concerned with the participative collective learning, so that we positioned it below the axis. Moreover, since "Project-based Collective OJT" links OFF-JT with OJT, we mapped it on the border between On-site and Off-site.

Actually, for realizing the smooth linkage, instructor has to design the connection between OFF-JT and OJT carefully.

(2)Enhancement of individual learning as well as organizational learning

It is usual for Off-JT that it assigns homework to the participants. However, it just aims at enhancing individual skill and knowledge. In contrast with it, the
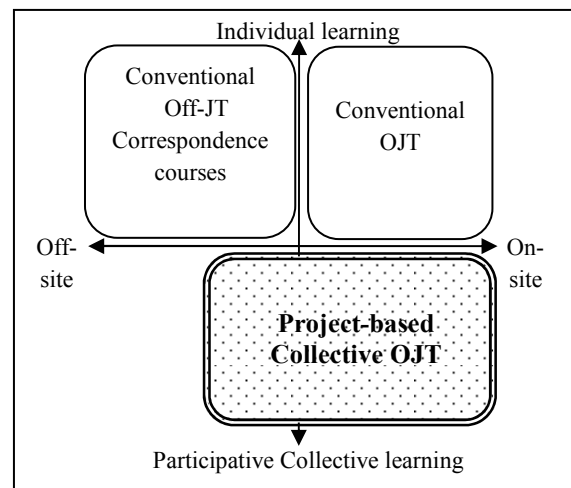

Fig. 9   Position of "Project-based Collective OJT" in the adult learning

tasks of "Project-based Collective OJT" here require the participant to cooperate with the members and managers. At the beginning of the on-site practice, the participant of the seminar explains about what he/she leaned at the seminar to other members and managers, so that they can share the knowledge and skills. Through the project activities they experience organizational and collective learning, not only individual learning of the participant. "Project-based Collective OJT" certainly realizes a seamless and reciprocal transition between individual learning and organizational learning.

(3)Realization of the simultaneous and collective OJT

Each participant in the seminar plays a role of leader and facilitator at the OJT, and the project members/managers have a chance to learn a problem solving method concurrently. In a sense, success of "Project-based Collective OJT" depends on the leadership of project leader. However, the materials and the instruction of instructor serve as accelerators for the project members. This is not the same idea as the "Workplace Learning" proposed by Works Institutes (Works Institute [10]). "Project-based Collective OJT" realizes simultaneous and collective OJT by embedding the methods to the materials and by motivating the participants.

4.3 Support for "Project-based Collective OJT"

Finally, we discuss how to support "Project-based Collective OJT" (see Fig. 10) by using the framework of the support system to Participatory Decision Making process, proposed by Toyota and Kijima (Toyota and Kijima [11]). Each participant of the seminar organizes a project with members and managers at each office by
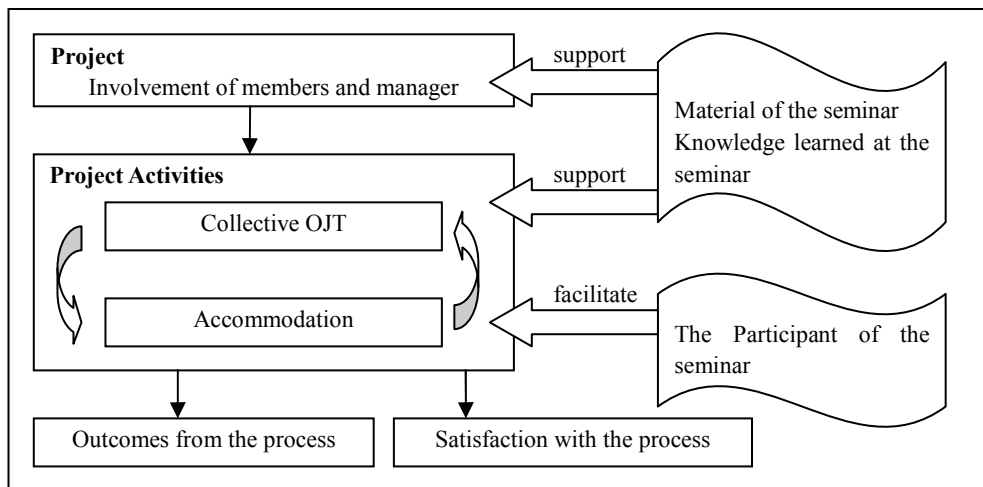
Fig. 10   Support to process of "Project-based Collective OJT"

using the materials distributed at the seminar as mentioned in 4.1. Instructor assumes the participant of the seminar to play a role of facilitator at the workplace. "Project-based Collective OJT" continues until it achieves some accommodation for the issue. The process produces tangible outcomes (the accommodated Action plan, the acquirement of the problem finding and solving methodology) as well as certain satisfaction of the project members with the process (Refer to 4.1).

5. CONCLUSION

By the arguments above, we would like to conclude that as an educational methodology for adult education, our "Project-based Collective OJT" is not only a well organized theoretically but also works as an effective and efficient methodology practically. Judging from comments of the participants, we believe that the methodology is promising in providing places for the employees to create values, particularly for organizations surrounded by rapidly changing environment.

REFERENCES

[1]Terasawa, H. The guideline of OJT for managers, Nihon Keizai Shimbun, Inc., 2002, (in Japanese).
[2]Works Institute. "Works Human Management Research 2003 comprehensive report", 2004 Vol.1 Works Institute, 2004. (in japanese)
[3]Chujo, H. and Kijima, K. Soft System Approach to project-based education – Linkage between classroom learning and its practice -, Collected papers of JASMIN 2004 Autumn Convention. The Japan Society for Management Information. pp.391-394, 2004. (in japanese).
[4]Chujo, H. and Kijima, K. The proposal of the Action Education by Project which brings learners ex post action, Collected papers of JASMIN 2005 Spring Convention. The Japan Society for Management Information. pp.298-301, 2005. (in japanese).
[5]Jackson, M. SYSTEMS THNKING Creative Holism for MANAGERS, John Wiley & Sons Ltd, 2003.
[6]Checkland, P and Scholes, J. Soft Systems Methodology in Action, John Wiley and Sons Ltd, 1990.
[7]Mingers, J. & Gill, A. Mutimethodology: The Theory and Practice of Combining Management Science Methodologies, John Wiley & Sons Ltd, 1997.
[8]Lifelong Human Resources Development Center, Survey & collaborative research development business report - The course development by educational training method utilizing "consciousness" -, 2003, (in japanese).
[9]Rossett, A. , Douglis, F and Frazee, R. Strategies for Building Blended Learning, http://www.learningcircuits.org/2003/jul2003/rossett.htm, 2003.
[10]Works Institute, "Re-creation of OJT", Works No.71 http://www.works-i.com/mail/53696/501/contents71/, (in japanese).
[11]Toyota, T and Kijima, K. Contingent Framework for Supporting Participatory Decision-making, International Journal of Knowledge and Systems Sciences, 2[1], pp19-24, 2005.