Journal of Engineering Education Research
Vol. 17, No. 5, pp. 23~27, September 2014

# The Way to Make Student Project Activity Successful

Takao Hanabusa[*,†] · Masaki Konishi[**] · Satoshi Kiriyama[***]
[*]Emeritus Professor of Tokushima University
[**]Former Guest Professor of Tokushima University
[***]Associate Professor of Tottori University

**ABSTRACT**

Student independent project activity is beneficial for enhancing many kinds of abilities, e.g., team working, collaboration, communication, presentation, creativity, leadership, and so on. More than ten project teams actively perform every year in the Center for Innovation and Creativity Development of The University of Tokushima. The project management workshop was planned in order to make project activity successful. In this workshop, the team members studied the importance of holding a common objective among them and of making a clear plan for achieving the activity. They practiced brainstorming method and KJ method and experienced a PDCA cycle. The team activity will be fruitful on the basis of the project management method.

***Keywords:*** Project management, Student independent activity, Collaboration, Communication

## I. Introduction

Key points on the engineering education are (1) innovation and (2) globalization. In order to attain innovation, we must take away the present style, the present thinking way, the present organization and so on. If we stubbornly preserve an old style of thinking, no innovation will occur. In almost of all cases in the development of some new products or some new technique, a seed is very small in the initial time (the initial stage), and finally saturates at some level (the period of maturity). Almost of all the time when the former technique saturates in its growth, a perfectly different new idea occur as a very tiny seed. This seed will be cultivated and then grow up to attain innovation.

The engineers who work in this new era should be the person who can find such kind of seed and cultivate it. Current techniques are very complex and multidisciplinary. The engineer cannot find a new seed and cultivate it by him/herself. Only the way to do this will be a team work where researchers and technicians from different fields join together, communicate each other and have an ability of planning in the way of multidisciplinary thinking. From these circumstances, a perfect new and creative product of idea will be expected.

Received 29 September, 2014; Revised 29 September, 2014
Accepted 29 September, 2014
† Corresponding Author: hanabusa.takao@tokushima-u.ac.jp

## II. Project Activity in Tokushima University

The Center for Innovation and Creativity Development (CICD) was established in 2004 and has offered a field where student project can be freely activated. The main objective of CICD is to cultivate students as they become to have a creative ability and become to be able to perform their jobs with innovative mind in the future.

More than ten teams are in full activity with one-year project in the Innovation Plaza for performing project activities. Almost of all teams can attain their objectives planned in the initial stage but some teams cannot perform their activity. From the observation of the student activity, we realized that the reason is lack of their precise plan at the beginning stage, lack of communication among team members, a decline of durability of motivation for the activity.

## III. Workshop on Project Management

In order to help them from these circumstances and to help the project activity being successful, we have organized a workshop of project management for more than five years. The objectives of this workshop are as follows:

(1) To understand the concept of "ideas and planning", "action", "evaluation" and "improvement" through the project activity
(2) To understand the concepts of "purpose", "goal", "subject", "plan", "result", "outcome" and "evaluation"
(3) To learn an effective way of project management

At first, we learn the flow of the project management. Beginning with objective making, the project activity flows to team making, expression of opinion, determination of subject and action plan and so on, as shown in Fig. 1. Student members learn the concept of project management from the beginning to the final stage, including ideal finding, planning, performing and evaluation. This flow has also the same meaning with PDCA cycle.

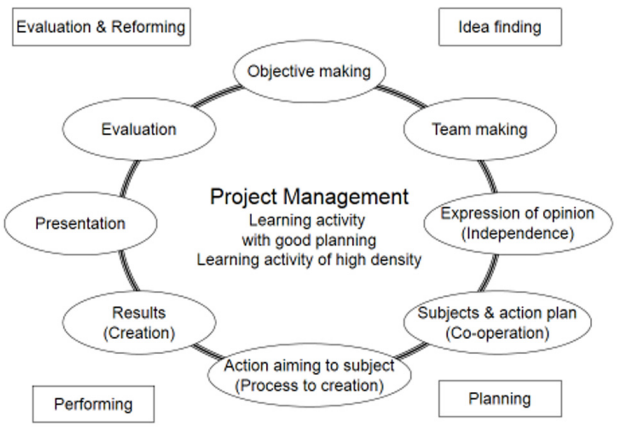



Fig. 1 Flow of project management

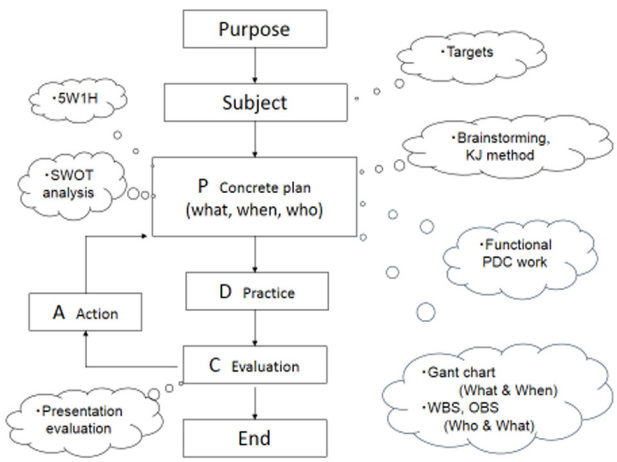



Fig. 2 Management flow of the project and PDCA

Fig. 2 is another representation of the management flow. At each stage, we learn several methods, such as brainstorming, KJ method1), functional PDC work, 5W1H, SWAT analysis and presentation evaluation, for performing a project activity.

At first the structure of project activity should be clarified. Fig. 3 shows the structure in order to understand the process of "plan", "do" and "check" system. We learn the system constituted with "plan", "do" and "check" process2). Especially, it is necessary for the students let to recognize that the planning is the most important part to perform a good project.

Table 1 shows the precise action program which was planned by the student staffs of the workshop. They decided purpose and objectives of the workshop, and listed up the practical items and made clear the action item which they must do in order to organize the project management workshop.

Gant chart is important to progress the project. The chart shown in Table 2 was also made by the student staffs in order to plan the project management workshop. The staffs made this Gant Chart in accordance with the planning table which is shown in Table 1. On the basis of this table, they proceeded their jobs step by step.

The workshop was held in the late stage of spring semester as a two-day course (Fig. 4). We, the staffs and the students, studied the structure, the way of planning and the way of management of a project activity. Also, individual methods,

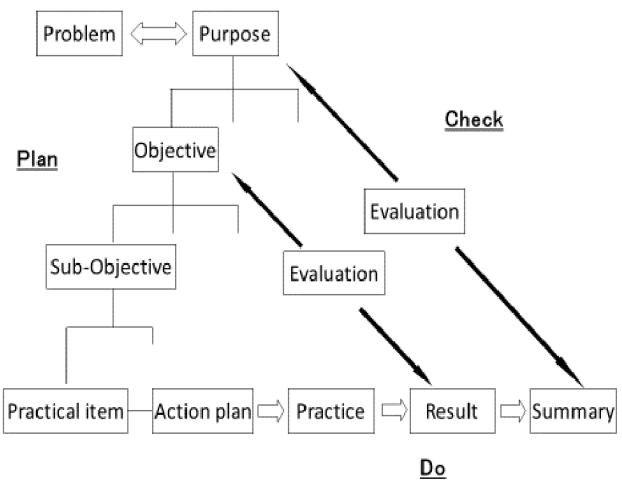



Fig. 3 Structure of project activity in order to understand the process of "plan", "do" and "check"

**Table 1 Structure of project activity (the plan made by the executive members)**

| Purpose | Objective | Practical item | Action items |
|---|---|---|---|
| To study a useful way of project mange-ment | To plan and practice an outdoor workshop | Making objectives | • To prepare document for advertize |
| | | Executive committee | • To settie the executive committee<br>• Selection of members |
| | | Date and place | • Date: midterm in June, two days<br>• Place: outside working facility reservation of the place |
| | | Planning of executive plan | • Detail discussion in the executive committee |
| | | Planning of the program of workshop | • Previous arrangement with the instructor<br>• To decide a role of student member<br>• To decide the role of the member |
| | | Advertisement | • To appeal to the new comers for participation |
| | | Exchanging activity | • Sports event in the afternoon of the first day<br>• Meeting in the midnight in the first day |
| | | Management on the day of WS | • Preparation in the previous day and management in the day of workshop |
| | | Cost estimation | • Application of supporting money and own expense |
| | | Preparation of bus | • Reservation of charter bus |

**Table 2 Planning, arrangement and practice of project management workshop (Gant chart)**

| Month & day / Work Item | March early | mid | late | April early | mid | late | Mat early | mid | late | June early |
|---|---|---|---|---|---|---|---|---|---|---|
| General plan(Gross plan) | ⇨ | | | | | | | | | |
| Reservation of meeting place and final arrangement | | ○ | | | | | | | ○ | |
| Contents and Program of Workshop | | ⇨ | ⇨ | ⇨ | | | | | | |
| Conformation of the mean of transport | | | | ○ | | | | | ○ | |
| Cost estimation | | | ○ | | | | | | | |
| Advertising to the freshmen and gaining the participants Confrmatilon of the number of partioipants | | | | | ⇨ | ⇨ | ⇨ | ○ | | |
| Preparstory commitlee | ○ | | | ○ | | | | | ○ | |
| Project management workshop | | | | | | | | | | ○ |

such as brainstorming, KJ method, PDCA cycle, Gant-chart are the important theme of the workshop. We trained a method of presentation and learned a presentation evaluation method.

After learning the above items, the members were grouped out into four teams including 4~5 students in a group. Each team determined at first their objectives and then made a precise plan for performing it.

In order to cultivate an ability of critical judgment, we developed the functional PDC work2), 3). At first we make three groups of “plan”, “do” and “check”. Then, group A makes a plan of their project and present their plan to group B. After the presentation from group A, the members of group B evaluate and ask questions to group A. Evaluation by oneself is difficult to find mistakes but if one team evaluates other team, mistakes or lack of contents can be found easily.

In the evening of the first day, the intermediate presentation was held. Each team reported a plan which was made by the group work for totally three hours. Then another team members evaluated the plan represented by one team from the stand point of “do”. In this workshop, only an evaluation between “plan” and “do” was performed.

The proposed questions and comments were taken back to the “plan” group and revised plan was finally presented in the second day for the final evaluation according to the method of presentation evaluation4). Table 3 shows the evaluation items which were determined by the students

themselves. All the members, students and staffs, took part in the evaluation and evaluated the works planned during this workshop.


Fig. 4 Project management workshop held in 2011 at Wajiki Outdoor Center

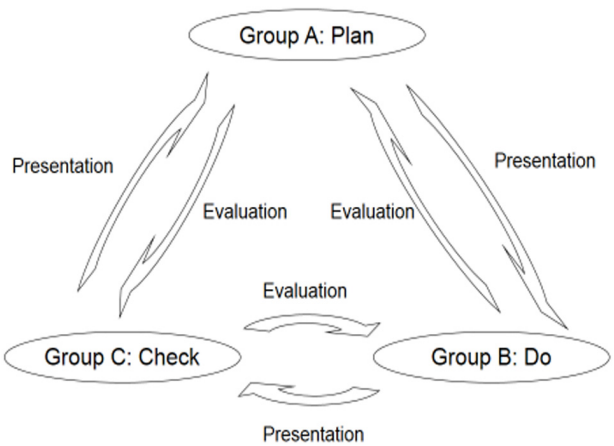



Fig. 5 Functional PDC work

Table 3 Presentation evaluation for the plan of new products

| | Items for evaluation | Evaluation point |
|---|---|---|
| Creativity | ① The works is creative | 4 3 2 1 |
| Collaboration | ② The plan contains coliaborative splrit | 4 3 2 1 |
| Feasibility | ③ The work will be done as planed | 4 3 2 1 |
| | ④ The work will be finished within the planned period | 4 3 2 1 |
| Social contribution | ⑤ The work is useful for a community | 4 3 2 1 |

Students who participated in this workshop expressed their impressions as follows:

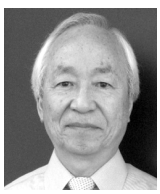
/ We learned a way of deep thinking with other team members.
/ We studied a way of plan making and its importance.
/ We experienced frequent presentations and learned the method of presentation evaluation.

## IV. Summary

Through several items of the workshop on a project management, the important points for project activity which we have learned are the followings: (1) Objective should be maintained as a common understanding among the members. (2) A precise schedule should be planned in the first stage of the activity. (3) Motivation to attain objective should be continuously kept by frequent feedback process.

## References

1. Jiro Kawakita, “Hasso-ho”, Chuko-Shinsho, “Hassoh-ho”, 1967 (in Japanese)
2. Satoshi Kiriyama, Yuichi Ikeda, Yasuhiro Sato, Kyuma Tanida, Teruhiro Ichida, Ryosuke Kotani, Masaki Konishi, Takao Hanabusa, The New Group Work to Raise the Judgement of Young People, Journal of JSEE (Kogaku Kyoiku), Vol. 56, No. 1, pp. 83-88, 2008 (in Japanese)
3. Sigetoshi Ishizaki, Jun-ichi Ozaki, Shigeru Saito, Takeshi Nakatsuji, Takao Hanabusa, An Attempt of "Monotsukuri Education" by Sharing Method, Journal of JSEE (Kogaku Kyoiku), Vol. 58, No. 2, pp. 64-69, 2010 (in Japanse)
4. Takao Hanabusa and Kazuya Kusaka, A New Trial of Outcomes Assessment Based on Presentation Evaluation, Journal of JSEE (Kogaku Kyoiku), Vol. 50, No. 5, pp. 47-53, 2002 (in Japanese)



**Takao Hanabusa**
Emeritus Professor of Tokushima University. He received the Bachelor Degree of Engineering from Tokushima University in 1967, the Master Degree of Engineering from Tokushima University in 1969, and the Doctor Degree of Engineering from Osaka University in 1982. He worked at Tokushima University from1969 to 2010 and worked as a Director of the Center for Innovation and Creativity Development of Tokushima University from 2004 to 2009. His major research field is X-ray stress measurement and engineering education. He has a qualification of the Special Professional Engineering Educator from Japanese Society for Engineering Education.

**Masaki Konishi**

Visiting Researcher of AIST. He received the Bachelor Degree of Engineering from Tokushima University in 1967, and the Master Degree of Engineering from Osaka University in 1969. He worked at Canon Inc. from1969 to 2004 and worked as a Guest Professor of the Center for Innovation and Creativity Development of Tokushima University from 2005 to 2010. His particular field is Management of Technology.

**Satoshi Kiriyama**

Associate Professor, Science education, Tottori University
Received the Bachelor Degree of Engineering (1988) and the Master Degree (1990) from Waseda University
Worked at Mitsubishi Heavy Industries (1990~2000), and at the Center for Innovation and Creativity Development of Tokushima University (2004~2007)
E-mail: kiriyama@uec.tottori-u.ac.jp