Proposal to Measurement of Educational Evaluation on Cooperative Learning in Advanced Project Management Subject

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Abstract: In order to guarantee the educational effect in practice educating which designates the society member as the object, it is indispensable to execute the education design which is based on educational technology method such as instructional design. In this paper, important study item was calculated on the basis of the analysis result of the conceptual structure of PMBOK, the course program of project management subject was designed. In addition, measurement of the educational effect in project management subject is tried using with the questionnaire survey described with basis on important study item. It is obtained that the looking back study with group debate is to be study method in order to raise the educational effect.

Key words: Project management; Educational evaluation; Instructional design; Educational technology

1 Introduction

Feature of project management education is to be the practical education which is based on practical science, and the adult education which target at the working people. The knowledge regarding modern project management was systematized by Project Management Institute. The result is published as the project management body of knowledge (PMBOK) guide book. The class design of project management subject of Yamaguchi University is based on PMBOK.

Educational technology in the 1950's advanced in the United States as an academic system. It is purpose of educational technology to systematize the originality and ingenuity as education art which improves the educational effect and to support the education activity of educators. The range of educational technology has reached to all academic fields which relate to human science, management science and science and engineering etc. In Kirkpatrick's four-level model, Bloom's taxonomy of educational objectives, Gagne's Nine Events of Instruction and so on, it is known as the result of educational technology. At early stage, as for educational technology, it developed infantile education, elementary education and secondary education as a main research object.

On the one hand, theoretical system of adult education was rearranged as the andragogy by Malcom S. Knowles, adult education was recognized as the theoretical system which differs from elementary education. But, adult education theory was not located as a fundamental theory for human resource development because general adults are dealt with the target of education. The new education methodology where it focused on the human resources as a learner, in the United States in the 1980's, was systematized. That is instructional design. As for development of instructional design in order to assure the improvement of the educational effect, it is the new history in educational technology. Educational technology method was applied to also the teaching material development of project management education. The result was published as project manager competency development framework by PMI. But, as for development example of the project management educational program on the basis of instructional design, still report is little.

One of the causes of that is management system continues to advance day by day. Actually, PMBOK has been revised every 4 years. Therefore, we have the necessity to exert effort in order to reflect the essence of up-to-date PMI standards on learning contents. And, we should set the study goal which conforms to up-to-date PMI standard. Educational

technology is indispensable to the curriculum in order to achieve the study goal which is set appropriately and the execution of study evaluation.

In this work, instructional design technique was introduced in order to do the course design and formative study evaluation of the project management subject which is based on the educational technology.

2 Methodology

MOT graduate school of Yamaguchi University is the graduate school for the member of society. At the Yamaguchi University, project management subject is opened as one of the requisite subject in technical management education curriculum.

Number of student taking project management subject is 18 person (17 men, 1 women), and the average age is 42 year old.

The author decided the unique PM educational program, because there is no standard curriculum of project management education for the unspecific person. We have to develop the original and customized course program of the project management education for our students. The educational program designed on the basis of the analysis result of conceptual structure of PMBOK guide. Measurement of the educational effect was tried by doing the questionnaire survey regarding the study contents of subject. The answer person chooses the answer from three choices. Question was arranged a on the basis of the important study item in PM educational program.

2.1 Significance of educational evaluation

There are two educational effects expected by feedback analysis of the information about students and the learning conditions. One is an incentive effect and reinforces the motivation of the learner, and this influences practical confidence. The other is a decision making effect that influences directionality and action of the learning. A learner assesses the information feed back by themselves, and it is important that the learner analyzes the achievement degree of the project management study.

Currently, six points of the following are nominated for significance of the evaluation by the viewpoints of a learner and a teacher.

As significance of the learners, three points follow;

(1) It becomes the pacemaker of the learning

(2) Learners understand the direction of the value of the education.

(3) Learners get an opportunity to recognize themselves.

As significance of the teachers, three points follows;

(4) Teachers grasp the learning level of the learner

(5) Teachers confirm the achievement situation of the education target

(6) Teachers think about new means for the realization of the target that is not yet achieved.

The evaluation of education offers useful information to each of a learner and the teacher.

2.2 Course program for project management subject

The course program of project management subject decided on the result of process flow analysis of PMBOK is shown in Figure 1.

Class	Title
1 st	Role of Project Management in Corporate Strategy
2 nd	Project Scope Management
3 rd	Work Breakdown Structure
4 th	Project Time Management
5 th	Project Cost Management
6 th	Project Monitoring & Controlling with EVT
7 th	Project Quality Management
8 th	Project Risk Management
9 th	Project Procurement Management
10 th	Project Human Resource Management
11 th	Project Communication Management
12 th	Case : Plant Construction Project
13 th	Project Management Integration and Changing Management
14 th	Organizational Project Management Maturity Model
15 th	Summary and Latest Information on PMI Standards

Figure 1 - Course Program of Project Management Subject

2.3 Questionnaire survey

Questionnaire survey executed three times as shown in Figure 2. First questionnaire survey was done at start of course program and the second survey at the closing of project management subject. In addition, after the questionnaire survey when the ending, dividing the classroom into the group, it debated the group answer. Numbers of people of the group were 3 or 4. The model answer does not release through the period of the project management subject.

Matrix analysis it did in order to calculate the index for nine knowledge areas from the questionnaire of 25 questions. A few samples of questions are shown on Table 2. The matrix which from the answer of 25 questions is converted to scores of nine indexes is shown in Figure 3. These scores correspond to nine knowledge areas. A Range of the numerical value of the score is from 0 to 10. The understanding level becomes higher as the index approaches the number "10".

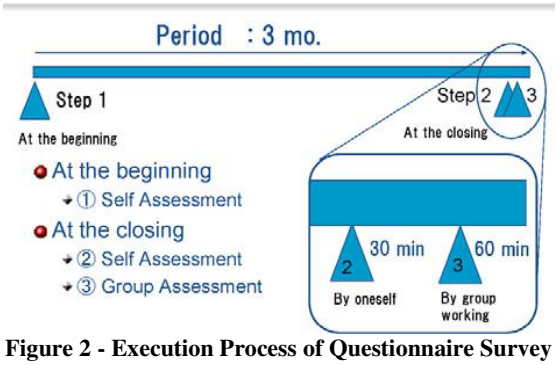


Figure 2 - Execution Process of Questionnaire Survey

Table 1 - Evaluation Target at Every Assessment Step

Target	Step 1	Step 2	Group discussion	Step 3
Personal	Ans. 1 SelfAsses.			
Personal		Ans. 2 Self Asses.		
Group			1 hour discussion to make a group answer	Ans. 3 Group Asses
Grading by reference	Score 1	Score 2		Score 3

Table 2 - Sample of Questions

1. A project is :
   (a) A set of sequential activities performed in a process or system
   (b) An ongoing endeavor undertaken to meet customer or market requiremen
   (c) A temporary endeavor undertaken to create a unique product or servisse
2. The three major constraints are :
   (a) Cost, Time, Quality
   (b) Cost, Time, Risk
   (c) Cost, Organization, Communications
3. All persons that are related to a project are called as :
   (a) Maternal organization
   (b) Project stakeholder
   (c) Contingency

3 Results and Discussion

In Figure 4, it shows the analysis result of questionnaire survey as the radar chart. Figure 4 (a)-(c) are the chart for class room Ube, Kitakyushu, and Hiroshima respectively. Figure 4 (d) shows total average of three class rooms. The analysis result of the personal answer which does before the class is shown with solid diamond. It is observed that understanding level of project management before the beginning class is equally 40% for nine knowledge areas for total the total average of three crass rooms in Figure 4 (d).

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25
Project Management Common	◎	◎	○	○		○	◎					○											○		◎
Project Management Integlation			○	○	○				○		○		◎	○		○				○		○	○	◎	
Project Scope Management	○		○	○			○	◎				◎					○		◎	◎			◎	○	
Project Time Management		○						○	◎	◎				○	○				○		○	◎		○	○
Project Cost Management		○			○		○	○	○					○	◎	◎		○	○		○			○	○
Project Quality Management		○		○			○	○			◎		○				◎		○					○	
Project Human Resource Management					◎	◎		△	○				○		○			○			○		○	○	○
Project Communications Management			◎	◎		○					○	○	○	○					○	○		○		○	○
Project Risk Management				○		○		△		○	○			◎	△		○		○		◎			○	
Project Procurment Management				△			○	○		△	○		○	○		○		◎	○	○			○	○	

Figure 3 - Correspondence Matrix Between 25 Questions and Nine Management Knowledge Areas

It shows the average score by personal learning assessment at the end of the class (step 2) with the square. By comparison with the chart at the beginning of the class, all of nine management knowledge areas are improved almost equally. Average improvement ratio of scores was 17.4%. In questionnaire survey before the class, the grade result or model answer example of the findings from are not fed back.

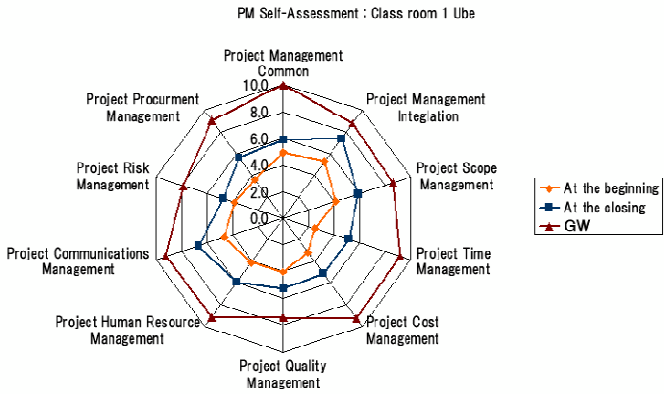
Because of that, experience of questionnaire survey before the teaching, is thought that influence has not been exerted on investigation after the business. This result suggests that individual degree of understanding improves as a result of the study in project management learning.

Then, the group answer after group debating (step 3) is shown with the solid triangle.

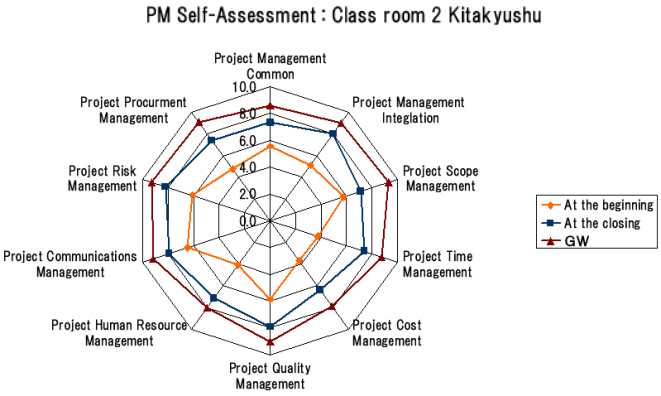
It is observed that all of scores become large by comparison with the private answer. Total average improvement ratio was 20.0%. Compilation of group reply is thought the thing which is suitable to the looking back study with group debating.

The decision making by the group is done by the joint ownership of knowledge, the support of discussion and the integration of private decision. Decision of the group decreases acknowledgment load and acknowledgment bias. This result suggested that understanding level has become high by the multiplier action between the looking back study effect and the group decision making effect.

It is strongly suggested that the looking back study with group debate is the study method of being effective in order to raise the educational effect in the practice education for human resource development.



(a)



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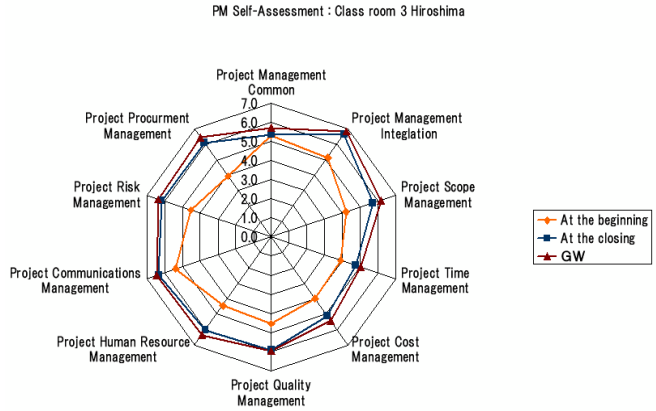

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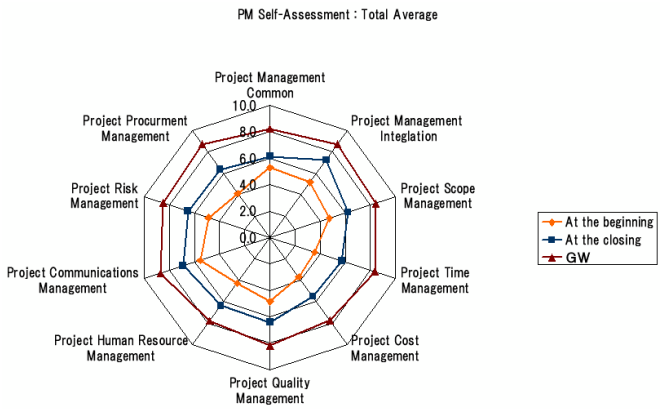

(d)

Figure 4 - Radar Charts that Show Results of Analyzing Answers of Questionnaire
(a) Class Room 1; Ube (b) Class Room 2; Kitakyusyu (c) Class Room 3; Hiroshima (d) Total average

In order to confirm the learning effect of the group debating and to discuss more in detail, we need some other tool to observe the communications among students. Then, I have proposed the Web Blog system as an online communication system by using Google Apps service.

4 Conclusion

In this paper, it is reported that a result of trying the measurement of the educational effect in the project management subject in Yamaguchi university. It decided the course program of Project management subject, on the basis of the conceptual structure analysis of PMBOK. It executed the measurement of the educational effect in project management subject, with the questionnaire survey which is formed with question of 25 questions. It digitalized the questionnaire survey result, as the index for nine management knowledge areas with matrix analysis. As a result, average score after the class was improved with 17.4% by comparison before the class. Furthermore, average score improved with the compilation of the group answer with group debate.

It is considered that the looking back study with group debate is the study method of being effective in order to raise the educational effect in the practice education for human resource development.

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