

# COMMUNICATION SCAFFOLDS FOR PROJECT MANAGEMENT IN PBL

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## ABSTRACT

In this study, the role-playing situation and the system requirement list are adopted into project-based learning classes to develop web applications. In the classes, the third-year undergraduate project managers communicate with the client of the project rolled by teachers on the Web bulletin board. These are expected to act as scaffolds to promote communication between the project manager and the client. The project management class without these scaffolds was held in 2014 and 2016. The results show that these scaffolds seem to have worked effectively to some extent.

## KEYWORDS

Project Management, Project-based Learning, Collaborative Learning

## 1. INTRODUCTION

Project-based learning is effective because it makes learning deeper and builds social skills. PBL is performed in various tasks and environments. The project management class for the third-year undergraduates has been held in our university's information department (Sasaki, et al., 2014). After students have been taught about project management, they are given opportunities to practice what they have learned about project management. The first-year undergraduates work on team problem solving in the PBL class. The third-year undergraduates act as a project manager (PM) for the first-year undergraduates' team. Although the aims of these classes are different, both of them could build their social skills and improve their performance (Sasaki et al., 2014).

However, about project management, we found some problems. One of the main problems is that the third-year undergraduate PMs (3yPMs) tend to decide specifications of the Web system without hearing opinions from the client. In this case, the teacher acts as the client of the Web system development project. Some of these 3yPMs have a tendency to design the system based only on their own thoughts and seem to disregard the client's needs. Moreover, at times they have been known to just ask the teacher to provide them with the answer. Even in such cases the 3yPMs work on complex activities such as system programming, and they appear to be sincere and serious about their work. Woods has noted that unsuccessful problem solvers tend to spend most of their time doing something, whereas successful problem solvers spend most of their time deciding what to do (Woods, 1994). It seems that understanding the process of problem solving is very important, particularly for people in project management, as it is their responsibility to determine what must be done to achieve success on a project. One of the effects of the role-playing is that it puts added values like creativity and a student-driven approach into traditional PBL, which emphasizes problem-solving skills (Chan, 2012). The 3yPM will propose their own solution to the client and get opinions about it. In this process, creativity and a student-driven approach are necessary for the 3yPM. In addition, it is expected that the requirements and specification list might help the 3yPM to organize the proposal systematically.

This study aims to promote communication between the 3yPMs and the client so that 3yPMs exchange appropriate information with the client and understand the needs of the client. To address this issue, the role-playing situation and the requirement and specification list are adopted when the 3yPMs communicate with the client on the Web bulletin board. These are expected to act as scaffolds for effective communication.

## 2. COMMUNICATION ON THE WEB BULLETIN BOARD

On the conception and initiation step of the project management, the 3yPM defines the specification of the Web system based on the clients' order document. Because the order document is just a rough description, it is necessary to hear the opinion from the client about the concrete function. The 3yPMs make the requirement and specification list. The requirement and specification list includes "item ID", "requirements and specifications proposed by PM", "comments from client" and "remarks". The 3yPM will be able to realize requests and specifications concretely by making the requirement specification list. It becomes clear on this occasion if there is an uncertain part. The 3yPM posts a message with the requirement specification list attached, and writes questions to the client if necessary.

The 3yPM writes a message as playing the role of the employee of the software manufacturer. The teacher playing the client write responses from the client. This role-playing is expected to lead the 3yPMs to deeper understanding of the requests and the specification. The details of the role-play are as follows.

- **Situation setting:** A software manufacturer receives an order for the development of a Web system from the secretary division of a university.
- **Roles:** The 3yPM is an employee of the software manufacturer, and a teacher is a client who represents the secretary division or a laboratory of the university.

The work procedures of the 3yPMs are as follows.

- **Receive the order document:** The order documents for Web system are given to the 3yPMs. Based on the explanation of what the goals of the system should be, the 3yPM makes the requirement and specification list.
- **Sending the message on the client:** The 3yPM posts the message on the bulletin board with the requirement and specification list attached.
- **Communication on the bulletin board:** The 3yPM receives comments from the client and iteratively adjusts, corrects, and updates the requirement and specification list. The work in this procedure is carried out on the bulletin board of the learning management system (LMS).

## 3. CLASS PRACTICE

These scaffolds (i.e., use of the requirement and specification list and the communication on the bulletin board) were used in the project management classes in 2014 and 2016. A project management class without these scaffolds was held in 2013. The 3yPMs write the project-file as the final outcome on the conception and initiation step of the project management. To examine the effect of these scaffolds, the descriptions of "the true needs" in the project-file are compared. There are 7 subjects in 2014 and 2 subjects in 2016.

## 4. RESULTS OF THE PRACTICE

The number of messages posted to the bulletin board is shown in Table 1. Half of these messages are replies from the client. Table 2 shows the number of project-files which mention of the client's need in "the true needs." Some of the 3yPMs wrote only the functions of the Web system or the title of the order document in the project-file. Figure 1 shows examples of the communication on the bulletin board. One of the 3yPM sent a message with the requirements and specification list attached, and received comments from the teacher. The 3yPM played the role of the employee of the software manufacturer and the teacher played the role of the client who represents the student support section of the university.

In 2014, a questionnaire survey was administered after the course. The result of the survey shows that 60% of the respondents felt the role-playing was useful. From the place provided for giving a free-form response, we received these opinions:

- I think the role setting is effective for learning project management.
- I had a good experience and I could exchange emails in a form similar to what is used generally in society.
- I felt that the role setting was only perfunctory and was made use of only in writing formal documents.

Table 1. The Number of Postings to a Bulletin Board

3yPM ID	Number of messages	
	2014	2016
1	4	4
2	4	4
3	4	/
4	6	
5	6	
6	6	
7	6	

Table 2. The Number of Project-Files Which Mention About the Client's Need in "The True Needs"

2013	2014	2016
4 out of 8	6 out of 7	2 out of 2

<p><u>Subject: Sending requirement specification lists</u></p> <p>Dear Sasamoto,</p> <p>I modified some items of the requirement and specification lists according to your designation. In addition, I added the brief description of the Web page design and the reservation information edit function for teachers.</p> <p>Please feel free to contact me with any concerns or questions that you may have.</p> <p>Regards,</p> <p>M. Hata Project Manager, QD Software Service Co. Ltd.</p> <p>[Attachments: reqt_spec_list.xlsx]</p>	<p><u>Subject: Re:Sending requirement specification lists</u></p> <p>Dear Hata,</p> <p>Thank you for sending the details of the Web design and reservation information edit function.</p> <p>Is it possible to indicate vacant facilities on the facilities lists page and add reservation function on the same page?</p> <p>In addition, we would like to add, delete and edit the facilities data. Are these functions included? If not, please add them.</p> <p>Regards,</p> <p>S. Sasamoto Team Leader, Student Support Section, TK University</p>
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Figure 1. Example of the Communication on the Bulletin Board. the 3ypm Sent a Message on the Client, and the Client Replied to It

## 5. DISCUSSION

From results shown in table 2, it seems that these scaffolds have some positive effect. It seems that the client's needs became clear by making the requirement and specification list. However, the effect of the role-playing is not clear. From results of the survey, it seems that students thought they managed the comments and the requests from their clients appropriately and found the role-playing useful for setting the conditions governing their project. In addition, they seemed to feel useful because they could experience the social style of being an employee of the software manufacture and the client of the project. The Japanese students tend to feel a hesitation in talking to teachers. Because the student played the role and wrote messages in formal business style, it seems that they could communicate with teachers more easily. On the other hand, it seems that the negative responses came from a perception that the role-playing was unnecessary and only perfunctory. Overall, these scaffolds seem to have worked effectively to some extent.

## 6. CONCLUSION

In this study, the role-playing situation and the requirement and specification list are adopted to promote communication between the 3yPMs and the client so that 3yPMs exchange appropriate information with the client and understand the needs of the client. It seems that the 3yPMs could get deeper understanding of the intention of client by making the requirement specification list. Though the effect of the role-playing was not clear, some students felt a positive effect from the role-playing.

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