https://doi.org/10.36315/2025v1end090
p-ISSN: 2184-044X e-ISSN: 2184-1489 ISBN: 978-989-35728-7-0 © 2025

DEVELOPMENT OF INTERVENTION CASE CARDS TO HELP PBL INSTRUCTORS IN REFRAMING THEIR ROLE PERCEPTIONS

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Abstract

Recently Project-Based Learning (PBL) style concentrated on real-world issues has been employed in many educational institutions as a learner-centered approach. In the approach the role of an instructor is not to provide knowledge, but to assist learners' progress. Many instructors involved in the practice of PBL, unfortunately, still do not clearly understand their own role, despite the significance that has been presented over the years of encouraging instructors to change their mindset. This study aims to develop a collection of "Intervention Case" Cards to help instructors in reframing their role perceptions within the PBL context, and to design a training program with the cards for evaluating their effectiveness in encouraging the mindset shifts. We collected real intervention examples with experienced PBL practitioners, then developed a set of 30 Intervention Case Cards, throughout iterative prototyping for refinement. The cards have three features: (1) each card presents a concrete example of instructional intervention and (2) corresponds to one or more of the key instructor roles in the learner-centered approach, and (3) the description of instructor's role is adjusted with the PBL context of the institution implementation. The features allow instructors to imagine specific intervention situations and to intuitively judge whether a case should be intervened in supporting learners of actual PBL practice.

Keywords: *Project-based learning, learner-centered approach, faculty development, reframing.*

1. Introduction

For surviving in the VUCA society, it is essential to have the skills to communicate with different people, gather information from different media, make decisions and solve problems in a flexible and resourceful manner. Here, VUCA stands for Volatility, Uncertainty, Complexity, Ambiguity. Young people preparing enter society near future will have to continue learning throughout their lives, as AI and other technological innovations will make the knowledge and skills acquired in school education obsolete faster. For continuous learning, they need to develop self-directed skills during their school life. It is indicated that they are acquired to be able to set their own learning goals, formulate plans to achieve them, carry out self-evaluations and set the next goal. To develop these skills, educational institutions are introducing a learner-centered approach in educational programs. Among these, PBL, which focuses on real-world problem-solving, is being increasingly adopted, particularly by higher education institutions.

According to a report of Japan government, the percentage of higher education institutions in Japan that implement Project-Based Learning within the regular curriculum has increased by approximately 20% over the ten years since fiscal year 2012 (MEXT 2012; a white paper of the Ministry of Education, Culture, Sports, Science and Technology in Japan government). Among learner-centered approaches, greater emphasis is placed on students' activities which may introduces more variables such as the need to coordinate with external stakeholders and to link learning outcomes with real-world issues. Instructors, therefore, are required to make a significant shift from own roles in the traditional professor-centred approach to more appropriate roles (e.g., Reigeluth, Beatty, & Myers 2017, Pan, Seow, Shankararaman, & Koh 2021, Pengyue, Nadira, Danli, & Wilfried 2022). There are many excellent training programs for instructors, like Buck Institute for Education, that link theories and concepts with leaders' educational practices (Suzie & John, 2018). However, despite the growing number of PBL courses, only a limited number of institutions are even supporting instructors in promoting role transformation. It is unfortunate, therefore, that the number of faculty members who can properly engage in PBL programs has not increased.

We have been involved in educational improvement activities at an engineering college, hereafter KOSEN. Then we distributed a guideline for instructors in charge of a PBL course to reconstruct their own roles as a support person in learner-centered approach including specific actions, and have conducted training sessions for attempting to provide opportunities the instructors to reflect on their practice (Ishida et al., 2017, Ishida, Takeoka, & Matsuba, 2018). For our regret, the training was limited to a mere exchange of information, or his/her perspectives on reflection were often self-serving. Some participants resisted the idea of reflection, and gradually fewer people attended the training sessions. In some cases, the role perceptions and behaviors of them changed in a different direction from our will. It is not easily lead to changes in the roles and behaviors for PBL instructors. We reflected our practices from the perspective of whether the training programs intended to change participants' attitudes have not been progressing. Then we found many instructors were unable to envisage specific actions in supporting students, and to link training content to their practice, and so (Ishida, Mizushima, Tanaka, Suzuki, & Matsuba, 2024, Kai, Ishida, & Matsuba 2024).

As a new initiative, we have developed Intervention Case Cards and a training program using the cards to help instructors reconstruct their role awareness in the context of the PBL course they teach via the considerations. In the present paper, we show the effectiveness of the training program using the Intervention Case Cards that we obtain from a formative evaluation practice. The research questions set by us are as follows: RQ1: To what extent are the training program with the Intervention Case Cards developed useful for instructor satisfaction and action planning? RQ2: Were the instructors able to reframe their perceptions of PBL and the instructor's role in the six roles that we expected them to play?

2. Methods

2.1. Development of intervention case cards

We developed Intervention Case Cards to be used in a training program with the instructors at KOSEN who conduct PBL courses with the mixed departmental grade teams as described above. The role of the card development is to enable instructors to reflect on own role perceptions and actions in PBL more meaning-oriented and deeper rather than superficial and rational way (Korthagen, 2017) and to encourage interaction between other instructors, i.e., participants of the workshop, to help reframing their ideas about students supports in PBL practice. Therefore, we designed the cards as (a) the cases are to be close to the context he/she was in past PBL practice, and (b) the role of an instructor is notated along with his/her perceptions and actions of the cases. In developing the cards, we reorganized the roles of teachers as described by Reigeluth et al. (2017) to fit the context of PBL practice at KOSEN, resulting in the following six roles; Support for Goal setting (R1), Support for designing and selecting group assignments (R2), Facilitation of learning (R3), Facilitation of task execution (R4), Support for evaluating learning and performance (R5), and Group mentoring including mental care (R6).

We proceeded with the development of the card using the following procedure: 1) Based on the results of observations and interviews with veterans and new faculties in the target institution, we picked up 47 items illustrated conscious or unconscious actions by them. 2) We asked some faculties who had experience teaching classes at the target schools and experts in instructional design to assort the 47 actions into the six role categories and to check the level of agreement each other. Also the instructional design experts were asked to review the 47 actions and identify areas for improvement. 3) The actions with high concordance were retained, while that with low concordance or noted in the expert review were revised. 4) As the role R1 and R5 had fewer action i.e., item cards among the six roles, we added some actions selected from the Buck Institute for Education's PBL instructor's rubric (Suzie & John, 2018). Finally, we completed Intervention Case Cards consisted of a set of five cards per role.

2.2. Practice of the training program using the intervention case cards

Next, we developed a training program using Intervention Case Cards. The program consists of the following four pieces of work: a one-hour pre-assignment and a two-hour workshop. At the end of the workshop, participants are asked to respond to a questionnaire on their satisfaction with the training program and the extent to which they felt each work contributed to the creation of an action plan. We then present an overview of our training program.

“Preliminary assignment” is called Work 1: Review the practices in PBL classes that you have taught in the past three years; write down the roles and actions of teachers in PBL classes; ask the participants to write down their images of successful PBL classes; and ask the participants to write down the roles and actions of teachers in PBL classes. “Share pre-assignment” is the Work 2. All participants present the results of own preliminary assignment. The Work 3 “Confirmation of past experiences” is divided into two small tasks. The section one is participants classify the PBL class into two categories of “doing” and “not doing” while looking at the 30 cards (Work 3-1). Then by attaching stickers to the list

sheet with the results classified by individuals, it is possible to visualize for each role which items many participants answered as “doing” and which items few participants answered as "not doing. The next section is group working. In each group, participants identified and discussed commonalities and differences in the results of each other's responses. For the items that participants answered they were not doing, they received hints from those who answered they were doing them and thought about how they could do them in practice (Work 3-2). The final task is “assignment and reflection”. They write an action plan for the next year's class and an image of a successful PBL Practice as Work4. The training program completed through these developments was approved by the Institutional Review Board (IRB) and was piloted with five instructors in March 2025. One of the participants was a new instructor member who will be teaching the class in question, and was therefore excluded from this analysis.

3. Result and discussion

Table 1 illustrates satisfaction rate in the post-program Questionnaire. All participants responded 7 or higher out of 10. We show how each of the works (Work 1-3) is helpful in the creation of own action plan (Work 4) in Table 2. There is no person marked less than 6 points as both tables show, so that we have confirmed that all tasks designed in the training program are working as intended and helping the participants.

Table 1. Satisfaction with the training program.

	6 and below	7-8	9-10
(1) Would you recommend the training program to other teachers who did not participate this time? (On a 10-point scale)	0	2	2
(2) How satisfied are you with the training program? On a 10-point scale, please rate your satisfaction.	0	3	1

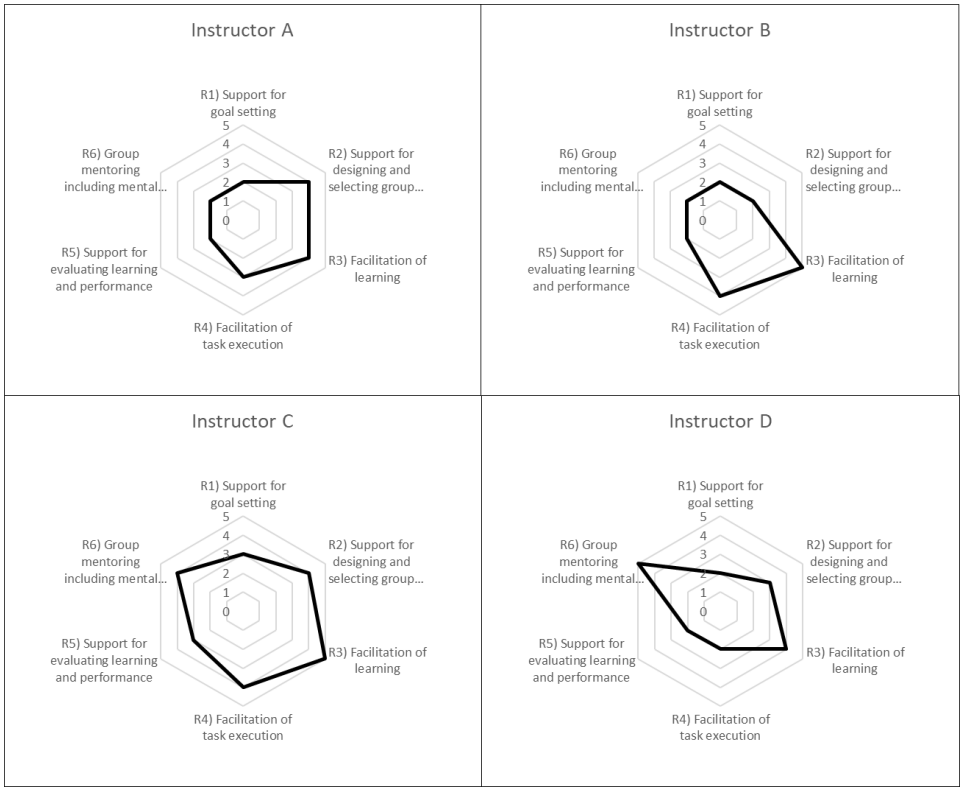
Table 2. Contribution of each task to the creation of the action plan.

	Helpful	Somewhat helpful	Somewhat not helpful	Not helpful
(1) Reflecting on my own actions in PBL classes so far (Work 1)	3	1	0	0
(2) Using cards based on the PBL classes I teach, I confirmed my own actions in classes and the reasons for them (Work 3-1)	1	3	0	0
(3) Using cards based on the PBL classes I teach, I learned about the practices and ideas of other teachers (Work 3-2)	2	2	0	0

We then proceeded to investigate whether a reframing of the participant' perceptions of their role in PBL practice had occurred or not via the workshop. This is main purpose of current project. The following are the results of a comparison of the descriptions in Work 1 and Work 4 for each teacher. Regarding the ideal PBL image, instructor A simply hoped for new experiences and awareness previously, but in the post-work, the image changed to one in which awareness and change occurred as a result of challenging the students in some way. Reflection on action (post-action reflection) was added to the instructor member's role recognition and action. In the pre-survey, instructor B described his ideal PBL image in terms of instructor involvement. In the post-program, it was added to the pre-program content that the theme should be set in a way that both students and instructor could work on it while maintaining their curiosity and motivation. Regarding the role recognition and actions of the instructor members, the program originally emphasized the students' independence and gradually provided support to enable students to work autonomously on their own, but in the post-program, he set his individual goal is support for learners.

The instructor C did not show any change in the description about ideal PBL image between the pre- and post-project cycles. However, changes were observed in the instructor member's role perceptions and behaviors. He mainly mentioned from the perspective of a project manager in past, but in the post-description, he commented about supports for each student to autonomously implement a cycle of self-regulation by sharing not only the goals of the project but also the goals of each member of his team. Instructor D mentioned 2 points for the image of success as a team project and human relations previously and then added individual goal setting and proactive activities for the students' PBL activities in the post-program. His pre-descriptions focused on the changes of individuals through talking and/or observing his students, while the post-descriptions show about actions not only from the instructor members but also to delegate to a third-party familiar with the interaction and activities among the learners.

Figure 1. Classified as "doing" in PBL (Work 3-1).



The questionnaire shows that all participants were highly satisfied with the training program using the Intervention Case Cards. The participants also indicated that they found it useful to reflect on their own actions in past classes in Work 1, and to learn about other teachers' practices and innovations by using the cards in Work 3.

The comparison of the participants' descriptions of their images of PBL success and perceptions of their own roles and actions before and after the training program shows that all participants reframed their roles as PBL instructors. Since there were five cards for each role, a score of 5 indicates that all of the cards for that role were used. You can find there were differences in the roles focused on by the instructor members in Figure1. On the other hand, what all participants had commonly a low implementation rate of R1 (support for goal setting) and R5 (support for evaluating learning and performance) mentioned in the section 2.1. We consider that this is confirmation of our findings in the previous studies (Ishida, Mizushima, Tanaka, et al. 2024, Kai, Ishida, & Matsuba 2024). Of special note are instructor C and D. We think that they have a significant reframe occurred between the pre- and post-assessments. Although instructor D wrote fewer pages in the "Facilitation of task execution" section than the other participants, he wrote in the "New activities to be incorporated" section that he would connect with someone who was familiar with the content of the activities, which corresponded to the description in section 4. In the post-program image of successful PBL, it was added that the students' independence changes through their interactions with each other. This can be seen as an expansion from a one-on-one relationship between the teacher and individual students to a student-student and student-stakeholder relationship.

Figure 1 illustrates that the instructor D has a higher percentage of cards that are implemented in general compared to the other participants, and there is no change in the image of PBL success between pre and post. However, there was a significant change in his role behavior between pre and post, adding their perspective on project management and the need to set goals and self-evaluate individual students. Thus, it was confirmed that the training program using Intervention Case Cards has the potential to add new role perceptions and behaviors within the framework of the PBL instructor role, while preserving the beliefs that the participants value in their teaching.

4. Conclusions

In this study, we collected actual intervention examples from experienced PBL practitioners and developed a set of 30 intervention case cards through iterative prototyping for improvement. We then carried out a pilot training program utilizing the intervention case cards to validate the effectiveness both

of the cards and the program. In a post-training survey, participants reported high satisfaction with the training program, reflected on their own actions in previous PBL courses, and indicated that using the intervention case cards to learn from other teachers' practices and innovations was helpful in developing action plans. Furthermore, the training program utilizing intervention case cards suggested the possibility that it supported teachers in reconstructing their role recognition through reflection in the context of PBL project. We can confirm that the development of intervention case cards and the training program using these cards was a step toward overcoming the situation we were concerned about, where many teachers were unable to envision specific actions to support students and connect the training content to practice. In the next stage, we will conduct follow-up surveys with the teachers who participated in this program, closely monitoring how the reframed roles and actions of teachers in PBL are integrated into practice, while continuing to improve both the intervention case cards and the training program.

Acknowledgments

This work was supported by JSPS KAKENHI Grant Numbers JP22K02830, JP21K13646, JP20H04297.

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