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**Subject:** [JPtpp] Submission Acknowledgement

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## LETTER OF ACCEPTANCE

Dear Authors

We are pleased to inform you that your paper entitled : **“Improvisation of Project based Learning with Combination of Collaborative Learning As a Rapid Response to Pandemic Learning”**

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## Improvisation of Project based Learning with Combination of Collaborative Learning As a Rapid Response to Pandemic Learning

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### ABSTRAK

The Covid-19 pandemic caused the effects of learning activities from home. The phenomenon requires improvisation as a quick response so that the teaching and learning process continues to run and maintains learning motivation, especially in the scope of college. Activities that are assumed to be able to maintain motivation online is to provide tasks in the form of projects or Project Based Learning (PBL) which in this context does not mean eliminating face-to-face activities offline, but in the sense of providing sustainable projects in one semester and staying connected to lecture materials. This PBL is combined with Collaborative Learning (CL) in order to conduct a continuous project review. This research was conducted in Ma Chung University's Information Systems study program for Programming Language courses. The results of this implementation are evaluated by conducting FGD (Focus Group Discussion) in two stages. In the first stage there are some shortcomings that are then corrected by adding the obligation to upload the project to Github and intensify the involvement of lecturers. So in the second stage, FGD results show improved results. The results of the study are generic prescriptions, namely: the implementation of PBL accompanied by a mature plan and preparation, improvisation of PBL accompanied by the application of CL accompanied by the role of lecturers as facilitators need to be evaluated gradually, and the implementation of online collaboration can be applied because students can quickly adapt online.

**Keywords:** *Project Based Learning, Collaborative Learning, Response Pandemic Learning*

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### INTRODUCTION

The Covid-19 pandemic has had various effects in the world of education, especially in early 2020 which caused almost all educational institutions in Indonesia (and also all over the world) to carry out learning activities from home. This quick

phenomenon followed in various innovations and improvisations so that the teaching and learning process can continue to run and keep students' learning motivation increased, both for lecturers also students. Especially in higher education which have different specifications compared to elementary and secondary schools. The response to online learning makes it more difficult for lecturers to improvise the teaching and learning process (Bhaumik et al., 2020; Dute, 2020; Ravšelj & Tomaževič, 2020; Siswati et al., 2020; Wargadinata et al., 2020). This can happen because students in university, unlike students at the elementary and secondary levels, come from outside the city so it requires a different approach. On the other hand, lecturers must also respond quickly to this conditions that occur in pandemic times by doing innovation and improvisation in accordance with the field of science or practical courses and taught them. Especially for courses that include practicum activities or motoric activities. A quick response is urgently needed that can solve the problem.

One of the activities that are assumed to be able to maintain student motivation in carrying out the teaching and learning process from home online is to provide tasks in the form of projects or commonly referred to as Project Based Learning (PBL) (Davis, 2017; Deesomsak et al., 2016; Edy, 2020; Jones, 2019). PBL in this context does not mean eliminating offline face-to-face activities through the software that has been provided (such as Zoom, Microsoft Teams, Google Meet or others), but in the sense of providing a continuous project in one semester and staying connected to the lecture material. The implementation of PBL in the pandemic period also considers that many students who are outside the city (mostly from outer Java Island which have trouble in internet technology), especially in rural areas, are unable to hold face-to-face activities online with stable internet speeds. Thus, the reduced time in face-to-face activities can be replaced by project work using PBL, both independently and in groups. PBL which basically performs assignments in the form of solving real-world problems by students by doing investigations, data collection, analysis and interpretation of data, and drawing conclusions also reporting the results of its findings (Deesomsak et al., 2016; Isabekov & Sadyrova, 2018; Strobel & van Barneveld, 2009). Thus, PBL not merely engages students actively, but can also improve the professional competence of teachers due to their self-development in solving problems in the classroom (Lasauskiene & Rauduvaite, 2015). PBL itself is prioritized to be done in groups because during the pandemic, learning motivation can be increased by group assignments (Bavel et al., 2020; Goñi et al., 2020). This is due to the tendency of students who feel isolated due to home study policies or online learning, and when given tasks in groups, it creates motivation to keep doing the given tasks.

But not all tasks in PBL can be done in groups during pandemics, because for the scope of universities, many students have a domicile outside the city and are far apart, so there are difficulties in the process of discussion or group work. So that balance is needed in arranging assignments for a semester running so that there are no difficulties that can reduce learning motivation (Sadikin & Hamidah, 2020). Therefore, group assignments are done using the concept of collaborative learning or CL in order to overcome these difficulties. CL combined with access to technology has a well-considered effect in helping improve student learning performance (Iversen & Eierman, 2018; Van Rooij & Zirkle, 2016). So CL in this context can be combined with PBL to get better results.

As a rapid response in pandemic times, the research conducted in this article is the result of action research which is an improvisation of PBL into group assignments that are included with the CL method. The improvisation was done as a result of

online learning which led to the process of group discussion and project supervision to be done with the help of *conference* software, which in this study, we used Microsoft Teams. In addition, the courses that are used as the subject of this research are the field of Information Systems, namely Programming Language, so it requires in addition to theoretical explanation, it also requires project work for comprehensive extending of students. So that in some aspects it takes self-assignment and also in groups in one particular theme.

The application of PBL in this research was conducted in the scope of Ma Chung University, Information Systems Study Program and was implemented in the semester of the 2020/2021 school year, at a time when the teaching and learning process was actually fully implemented online. Thus, the research not only produces a scientific conclusion, but is also expected to be a generic prescription for other lecturers who have similar problems in order to innovate learning in the pandemic and post-pandemic.

## **METHOD**

The first step taken in the implementation of this PBL is to socialize the project to students by providing limits on the themes that students must adhere to. This is done so that the project is still in the corridors of the syllabus that has been set, but still gives freedom to students to improvise. The limitations placed in this scope are simple web applications that utilize JSON in performing *public API* access. Simply put, the application will take advantage of the results from the JSON (*Javascript Object Notation*) that are publicly available to be reused into the new application.

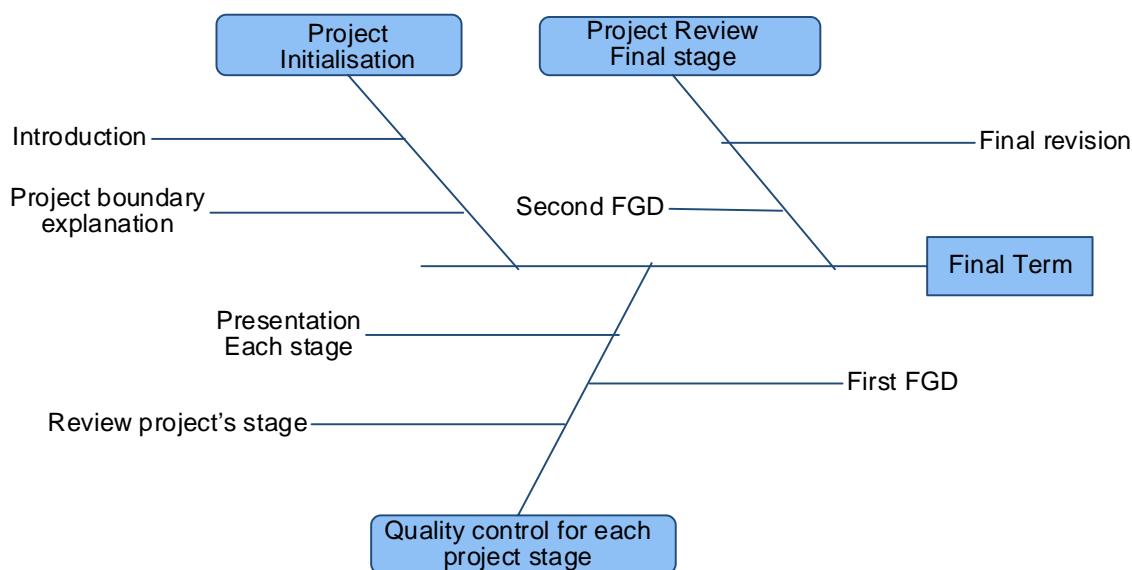
Next is the task of lecturers who provide materials to students, while also controlling projects that are done gradually. At the time of control, students are also obliged to present external progress that is being done to lecturers. This becomes the quality control of the project undertaken to stay in accordance with the original goal (Schneider &Pea, 2013).

At the time of the eighth week or midterms, at the same time FGD (*Focus Group Discussion*) was also held as an evaluation of the implementation of this PBL. Evaluation selection in the middle of the semester, in addition to revising the implementation if there are shortcomings, also serves to increase the motivation of students who often go down in the middle of the project process (Lasauskiene & Rauduvaite, 2015). While the use of FGD as a means of evaluation because for a short period of time, FGD is more effective for the sake of getting students' opinions (Flick, 2018; Richard et al., 2021; Wilkinson, 2008).

FGD was conducted using random interview techniques for 20 students, who came from two classes. Interviews are conducted online using the facilities of Microsoft Teams and take advantage of *the break room* feature for some more private questions. At FGD asked several main things, namely: (1) the development of student competitions, (2) collaboration between students and lecturers, and (3) professional performance of lecturers (Lasauskiene & Rauduvaite, 2015). These three main things will be further divided into several sub-sections that will be explained in the discussion section.

The next step is to review the final stage of the project. This review was conducted in the last two weeks of the lecture. This final review is also the last measurement of the results of the student project. In the final review process also held FGD second stage to get feedback from students with the same technique in the first stage. Briefly, this PBL implementation work diagram can be seen in figure 1.

**Figure 1** PBL Implementation Working Diagram



At the time of project work, students are divided into groups, but still work on the project individually. This makes PBL done independently but in each choice of project topics, they work collaboratively. For example, for the topic of public API work in which it issues an *array*, there are 6 to 8 students who work on each project, but form groups that exchange ideas and discuss how to access efficiently. Likewise with other topics, similar groups are formed.

The collaboration that occurs in this model is a response to the effects of pandemics that make the learning process online. In the face of this phenomenon, in addition to the motivation that is certainly decreased, lecturers are also advised to implement collaboration and group learning so that students or students can still feel interacting with each other (Dhawan, 2020; Mukhtar et al., 2020; Sandars et al., 2020). So in this context, collaboration becomes a solution to face the human *touch* crisis in the learning process.

Collaborative learning by utilizing technology (in this case offline learning) emphasizes the trust or *trust* of each group member to achieve the expected goals (Srivastava, 2020). In this case, lecturers as offline group leaders or *e-leaders* are required to be traffic controllers of communication and discussion while acting as facilitators who learn from each other (Alghasab et al., 2019).

## RESULTS AND DISCUSSIONS

The first evaluation of the implementation of PBL occurred in the eighth week, namely in the middle of the semester as well as the implementation of the first phase of FGD. In the first FGD, interviews were conducted on half of the students who came from two classes. The number of students involved in the first FGD as respondents was 20 people who were randomly selected and had been willing to take part in interview sessions. At the FGD, students were asked 7 questions from three topics that had been discussed in the previous chapter. Summaries of the results of the interview can be examined in table 1.

**Table 1.** First Stage FGD Results

<i>Category</i>	<i>Sub-Categories</i>	<i>Summary</i>
<i>Development of student competition</i>	Student development	More competence gained by students due to the search for wider sources online
	Responsibility for the project	Student responsibility for the project is better because of the facilitator function of lecturers and collaboration between friends who have similar themes.
	Development of the spirit of competition	The expected soul of the competition is not achieved because there is no explicit <i>reward</i> from lecturers.
<i>Collaboration between students and lecturers</i>	Student satisfaction with collaboration	Student satisfaction levels are still lacking because the online discussion process still requires adaptation.
	Student engagement in discussion and collaboration is active	Students in general feel satisfied due to the involvement of lecturers actively in each theme group.
<i>Professional performance of lecturers</i>	Projects that are closely related to lecture materials	Students feel the project has been closely linked to the material, but some still need more challenges in problem solving.
	Lecturer satisfaction with student performance	Lecturers are still dissatisfied with the passive performance of some students in discussions and collaborations.

Based on the results of the first FGD, a review was held on the implementation of PBL in the final half of the semester. Some of the improvements made include: (1) pay special attention to students who are still passive in the process of discussion and collaboration, (2) provide new options in project development, especially for students who have *more* ability to increase their innovation, (3) provide more value *reward* options for students who successfully complete projects faster with the least *bugs*.

So that in the final review stage of the project, students who were previously passive can become more active due to the personal motivation drive of lecturers. In addition, for students who have *more* ability can develop themselves.

In addition, it is given the obligation to upload project results to *Github* so that the results of the project can later be seen by the public openly. The results of the upload in addition to being open to the public also become a portfolio of student work. So that students feel more passionate in completing their projects as best as possible.

*Github* itself is a site that utilizes *git* technology or source *version control* that has the ability to store history from the work of a project, especially for software projects (Hutten, 2017). So in the implementation of this PBL, the utilization of *Github* is very helpful for the project review process gradually. Each of the project progress uploaded automatically through *Github* directly becomes a notification to the lecturer with the help of *invitations* as passive contributors in the same project.

Along with the use of Github, the collaboration model applied can run more smoothly. With the feature to do *forking* or *branching* that allows students in the same theme group to take each other and modify the program listing to then perfect their respective projects.

The *process of forking* and *branching* itself can simply be described as the process of retrieving a program listing from a project to be later modified without having to interfere with the original project, but can be used as a basis for improvement or revision for the project if it is considered to be able to improve the results (Chacon & Straub, 2021).

After the improvements made in the second half of the semester, and conducted a final review of the project, the second phase of FGD was again carried out. At this stage FGD, as with previous FGDs, it was randomly selected again in half of the class population and interviewed with similar techniques and questions. The results of the second stage FGD can be examined in the following second table.

**Table 2.** Second Stage FGD Results

<i>Category</i>	<i>Sub-Categories</i>	<i>Summary</i>
<i>Development of student competition</i>	Student development	Competencies become more developed with the help of Github and more lively collaborations
	Responsibility for the project	Students become more responsible with better support from lecturers, especially for students who feel less performance in the first half of the semester.
<i>Collaboration between students and lecturers</i>	Development of the spirit of competition	The spirit of the competition is slightly developed with the obligation to upload on Github which makes the project open for other students to see.
	Student satisfaction with collaboration	Students have felt quite adaptable to the online discussion model, because the same discussion model is also used in other courses in the same semester.
	Student engagement in discussion and collaboration is active	Students in general feel more satisfied because of the existence of Github, then each student feels more involved in collaboration actively.
<i>Professional performance of lecturers</i>	Projects that are closely related to lecture materials	With the increase in lecture material in the second half, students become more understanding of the relationship between the lecture material and the project being done.
	Lecturer satisfaction with student performance	Lecturers are more satisfied with the performance of students in collaborating and project results

So based on the results of this study, it can be given generic prescriptions to improvise in the implementation of PBL, especially in pandemic and post-pandemic times that will still rely on online learning. Generic prescriptions that have been promised in accordance with the initial purpose of the research, namely: (1) the implementation of PBL must be accompanied by a careful plan and preparation, both in terms of lecturers and projects to be carried out by students, (2) improvisation in the



implementation of PBL for online (and semi-online) learning can be accompanied by the application of CL accompanied by the role of lecturers as facilitators, so as to maintain student learning motivation until the end of the semester, (3) there needs to be a gradual evaluation and review so that it can be understood if there is a shortage in the midst of the implementation of PBL and can immediately be improved, and (4) the implementation of online collaboration can be applied given that students as a net generation who can quickly adapt to software that supports the implementation of CL online. Based on the results and conclusions of this study, it can be given advice for further research, namely: (1) improvisation of PBL can be combined with other techniques of constructivism flow, (2) the application of improvised PBL can also be applied in other subject matter to get different results, for example more conceptual material, (3) the need for quantitative testing to strengthen research results.

The results of this study can also create new insights from different points of view, that PBL is not only done by giving tasks in the form of projects, but can be combined with CL in order to increase learning motivation. In addition, improvisation can be a reference when learning in the post-pandemic period that will likely still be held not entirely offline (face-to-face), but combined with online meetings. There are some good progress between first and second FGD results. While students can improve their competencies using live collaboration (Goñi et al., 2020), and help of Github, they also realized that their responsibility for doing project are increased. The awareness of doing good project not merely based upon their intention to get good final score, but also pushed by their intention to show off their project to public (Iversen & Eierman, 2018). other research also mention that PBL in the implementation of the teaching and learning process in the field of Information Systems or Software Engineering in which there is practicum material, becomes one of the focuses in the innovation of the learning process (Czerniewicz et al., 2020; Gary, 2015). This is because in the practice or lab activity process, PBL is intended to help students to contextualize the concepts obtained into the real world. So in this study, PBL is expected to really help students to actualize the results of concept learning, as well as a quick response in dealing with the phenomenon of the learning process in the pandemic period. PBL in the context of courses that involve practice or lab activity, becomes a good solution so that students involved in it are better able to apply learning outcomes to the real world. So that in the end, PBL for students becomes a good training vehicle in practicing learning outcomes (Amamou & Cheniti-Belcadhi, 2018; Weber, 2016).

Thus the result can be assumed has already fulfilled the purpose of this action research. However, there are some consideration should be made in collaborative activity. In addition, it is also expected that the results of this study can develop the insights of teachers, especially lecturers in universities in the face of the current pandemic and post-pandemic period.

## **CONCLUSIONS**

Based on the results of the implementation of PBL combined with the CL, it can be drawn several conclusions including: (1) in the first stage of FGD, some interview results show dissatisfaction and shortcomings, both in terms of students and lecturers, but then become the material of evaluation and improvement in the second half, (2) improvements are significantly helped by the use of Github as a means for review and collaboration, (3) Student activity becomes more increased in the process of collaboration and project work with more intensive assistance from lecturers.

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