

# Collaborative Project Based Learning Implementation During Covid-19 Outbreak

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## ABSTRAK

**Abstract:** Covid-19 outbreak has already created such big changes in education all over the world. However, rapid response improvement is needed to overcome the reality. One of the improvements is using Project Based Learning (PBL) which ensured that students can still become active and enthusiastic during remote learning. PBL implementation can be done using collaborative technique, which empirically proven to have better result. This research took place in Information System Study Program at Universitas Ma Chung Malang, in course which includes laboratory activity (in this case is Programming Language course). This implementation then being measured using focus group discussion (FGD), which gather and interviewing random sampling to evaluate its effectiveness and being held twice in one semester, thus it can review and repair the implementation during half semester. This research should give generic prescription as its result for other lecturers who has difficulties in improving remote learning process during Covid-19 outbreak or post outbreak. After evaluating the implementation with three main topics (development of students, collaboration aspect, and professional development) from random sampling students, there are some improvements to made, which are: (1) lecturer become more active involved, (2) invite professional to give guest lecturer, (3) encourage about the importance of teamwork, and (4) giving reward and penalty.

**Abstrak:** Wabah Covid-19 telah menciptakan perubahan besar dalam pendidikan di seluruh dunia. Namun, perbaikan respons cepat diperlukan untuk mengatasi kenyataan tersebut. Salah satu peningkatannya adalah dengan menggunakan Project Based Learning (PBL) yang memastikan siswa tetap dapat aktif dan antusias selama pembelajaran jarak jauh. Implementasi PBL dapat dilakukan dengan menggunakan teknik kolaboratif, yang secara empiris terbukti memberikan hasil yang lebih baik. Penelitian ini mengambil tempat di Program Studi Sistem Informasi Universitas Ma Chung Malang yang pada mata kuliahnya meliputi kegiatan laboratorium (dalam hal ini mata kuliah Bahasa Pemrograman). Implementasi ini kemudian diukur dengan *Focus Group Discussion* (FGD) yang mengumpulkan dan mewawancarai random sampling untuk mengevaluasi efektivitasnya dan diadakan dua kali dalam satu semester, sehingga dapat meninjau dan memperbaiki implementasi selama setengah semester. Penelitian ini harus memberikan resep generik sebagai hasilnya bagi dosen lain yang mengalami kesulitan dalam meningkatkan proses pembelajaran jarak jauh selama wabah Covid-19 atau pasca wabah. Setelah mengevaluasi pelaksanaan dengan tiga topik utama (pengembangan mahasiswa, aspek kolaborasi, dan pengembangan profesional) dari mahasiswa random sampling, ada beberapa perbaikan yang dilakukan, yaitu: (1) dosen menjadi lebih aktif terlibat, (2) mengundang profesional untuk memberikan dosen tamu, (3) mendorong tentang pentingnya kerjasama tim, dan (4) memberikan *reward* dan *punishment*.

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Covid-19 outbreak has already created such big changes in education all over the world. At the same time, most schools and universities turn themselves into learning from the home condition, many teachers, lecturers, and students having mental breakdown facing this situation (Czerniewicz et al., 2020; Wargadinata et al., 2020). However, rapid response from this era is needed to overcome the reality. Many teachers tried to improvise learning process due to quick changes from classical class into remote learning during outbreak. However, there are some options in improving learning process in this remote learning situation. One of the improvements is using Project Based Learning (PBL) which ensured that students can still become active and enthusiastic during remote learning (Lasauskiene & Rauduvaite, 2015; Syakur & Musyarofah, 2019). Especially in the outbreak era, where

lecturers should protect students' mental health and create a better learning process, in order to prevent further weakening in their learning motivation (Sahu, 2020). While implementing PBL during Covid-19 outbreak, there are some considerations to be made for higher university students. One of them is maintaining students' relationships with each other since that most of them are coming from the outer city. Thus, there should be group features in PBL implementation to overcome students' lonely feelings during remote learning. This group feature can be done using collaborative technique, which empirically proven to have better result for PBL (Baser et al., 2017; Donnelly & Fitzmaurice, 2005).

Collaborative PBL allows student having clearer meaning in the discussion process and force them to interact each other (Donnelly & Fitzmaurice, 2005). Collaborative is also considered in giving high impact for students, especially in higher education (Jeong et al., 2019; Jones, 2019). This impact can be achieved if it complies with some elements, which are: (1) sustained inquiry, (2) authenticity, (3) reflection, and (4) public project. Thus, the lecturer should include them in Collaborative PBL implementation. Based upon these theories, this research which took place in Information System Study Program at Universitas Ma Chung Malang, implement Collaborative PBL in the rapid response to Covid-19 outbreak situation. While learning process becomes remote learning, some courses are hard to adapt, especially in course which includes laboratory activity (in this case is Programming Language course). Thus, the Collaborative PBL is being implemented with some adjustments to adapt remote learning situations. This implementation then being measured using *focus group discussion* (FGD), which gather and interviewing random sampling to evaluate its effectiveness (Flick, 2018).

FGD itself being held twice in one semester, thus it can review and repair the implementation during half semester. It also need to prepare next step for the rest of semester, so it can enhance students' (also lecturer) satisfaction during learning process. Especially during Covid-19 outbreak, which already gives such anomaly for over than a year. On the other hand, this research should give generic prescription as its result for other lecturers who has difficulties in improving remote learning process during Covid-19 outbreak or post outbreak. Mainly for remote learning process, for blended learning which its course containing laboratory activity.

## METHOD

This action research began with giving the students' project's option to be chosen for their activity for whole semester. While these options have become their boundary in creating a project according to material course limitation, it also gives them freedom to be creative by optimizing its unmentioned feature in the project's description. The freedom to choose should increase their engagement during remote learning process, because of their own choice will become their own responsibility.

On the other hand, the shock process after outbreak has given students (also lecturer) some impacts (Patricia Aguilera-Hermida, 2020; Sadikin & Hamidah, 2020). From the big changes of technology during Covid-19 outbreak usage until its usability among students to communicate with their own colleague and with lecturer. Thus, after project's option already announced, lecturer should review students' choice and giving feedback which part of their improvisation should be reviewed and repaired. This step become one of important stage before project implementation because it should help students to limit their project based upon course material and syllabus.

The next step is reviewing the project's progress during half semester while lecturer still doing remote learning process with time reduction. This time reduction is for giving students more time to deal with their project, also enlighten students' burden in connecting remotely. Instead, lecturer also giving a chance to students for collaborating and open their own discussion forums based upon their project similarity. This forum then split into small groups and turning lecturer as their facilitator. This lecturer's role creates collaborative PBL become more interesting for students because it creates students centred learning conditions (Chen & Yu, 2019).

At half-semester, the lecturer was also doing the first evaluation using FGD with some core questions which has already been prepared. The questions themselves contain some essential topics, which are: (1) development of students, (2) collaboration aspect, and (3) professional development (Lasauskiene & Rauduvaite, 2015). These topics emphasized how students can overcome the barrier during the outbreak, and the lecturer can improvise for rapid response in this situation. Thus, it can ensure that the rest of semester can be better in its implementation.

Last part of semester is about doing project review and prepare the project becoming public project. This last step includes controlling students' projects' quality before becoming public consumption and automatically become their portfolio. Afterward, final step is doing another evaluation using FGD with the same questions previously. Then the result will become consideration for lecturer and become generic prescription in facing remote learning condition. In brief, whole steps in this research can be seen in this diagram.

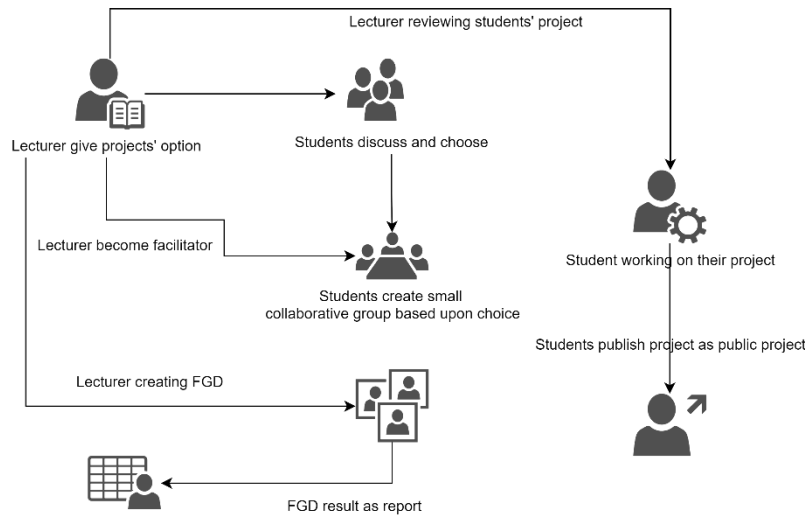


Figure 1. Diagram Flow

RESULT AND DISCUSSION

This research took place in Information System study program, at Universitas Ma Chung which located in Malang, East Java, Indonesia. There are two classes included in *Bahasa Pemrograman* course which contain at least 20 students in each class. Therefore, this population should give enough sample for implementing this method.

In this Collaborative PBL implementation, first barrier is about psychological condition of students during Covid-19 outbreak. While many students came from outer city in rural area, they have difficulties with their internet connection. This condition creates lag during online meeting, whether with online class also with collaborative discussion among them. Thus, using Microsoft Teams (the main reason using this software merely because of university already purchase the license for whole staffs and students), lecturer then created separate channels for collaborative purpose.

These separated channels can be used as mixed channel in collaboration process, whether for forum discussion and live conference. It means that students can use forum discussion if they have bad internet connection, and then they can switch into live conference if they already have good connection afterwards. This blended mode should give students more confidence and comfortable feeling in doing collaboration, because of the risk in getting failure of communication can be reduced. Comformance of students in overcoing internet connection problem is one of main point in getting success during Covid-19 outbreak, because many failures in remote learning during outbreak happen because of it (Dube, 2020; Wargadinata et al., 2020).

Next, PBL is being done by students in gradual process which is reviewed and controlled by lecturer. Whole steps in this process is taken partially, thus students can revise their project in small portion at a time. This partial step also can be seen by their own group, so other students in the same group can see the revision which also includes solution in it. While a student presenting the revision, other member can give suggestion or other meaningful critics that can help the project. Lecturer then can give credit and score for this suggestion which become collaboration between students while they did not even realize this seamless collaboration. After half-semester, lecturer then conducting first FGD with random sampling from students. There are 20 students which pick randomly and being interviewed as a group and also in private to implement first FGD. First evaluation result from half-semester FGD can be seen in following table.

Table 1. First FGD Evaluation Result

Questions Topic	Result summary
Development of student's project	Most students still having difficulties in their first step of doing project. Some of them still think that their group's mate cannot fully participate in the group actively Some students felt that the group's communication in the forum was not successful because of a lack of enthusiasm in live conference between them. Thus, it affects their project's progress in finding solutions.
Collaborative aspect	Most students felt that the collaborative aspect did not execute as expected because lack of communication between them
Professional development	Students tend in serious mode while there was lecturer involved in the live conference and moderating forum Most students can convince themselves that in the future, they can be a professional software developer Students also are ensured that they really can do a better project for their final term also for their future thesis

After the first FGD is being held, there are some evaluation and revision in next half-semester, which are: (1) lecturer become more actively involved whether in forum discussion or live conference for each collaborative group, (2) lecturer invite some of alumni who already become professional software developer to give guest lecturer. Thus, students can relate their projects with real application as their professional development, (3) encourage them about the importance of teamwork in their project development, and (4) giving reward and penalty for their project progress development.

Then, there was some improvement after the revision of implementation being held. After lecturer becoming more active, whether in forum discussion and live conference, students become more involved in collaboration session. The presence of lecturer can be a boost for their spirit or also a "guardian" since that new reward and penalty system being executed. However, the collaboration session in doing PBL was clearly done better than previous session.

Another improvement shown was after guest lecturer from alumni being held, students' confidence becomes increased and they become more active in asking questions as well as finding new solution using internet (Van Rooij & Zirkle, 2016). However, there is some worriedness that they can lack creativity while finding those solutions. This could happen because many internet resources already offering complete solutions which can be like their project. Thus, to prevent that phenomenon, lecturer should be careful on how monitoring each progress and project development steps from students, so it really showed how the project is done, not just being finished.

Afterwards, when the course almost over, lecturer held second FGD with another random sampling from classes. In this stage, students' projects were in final stage, and they already prepared for publish their project as public project in Github. Thus, they were assumed have already through whole collaborative PBL process and could give their opinion better than first FGD. The result of second FGD can be seen in the table 2.

**Table 2. First FGD Evaluation Result**

Questions Topic	Result summary
Development of student's project	The difficulties seem reduced because of lecturer's active involvement in project's progress Collaborative communication has already become better because of lecturer's presence and students can do the project in better ways
Collaborative aspect	Some students still cannot finish the project in perfect result, but they still felt satisfied with their progress While lecturer become active moderator in forum discussion and live conference, most students felt they can have better communication in collaborating with their group's member Some students felt that there should be collaboration between groups or between classes, because of need for new perspective for their problem's solution
Professional development	After guest lecturer session, most students can see clearly about what it will be done with their knowledge in the future, especially for their career.

## CONCLUSION

The result from both FGD clearly stated that in remote learning collaborative PBL, there are some important factors that should be considered as generic prescription, which are: (1) lecturer's active involvement should be more intense because of remote learning condition is giving difficulties in monitoring project's progress, (2) lecturer's role as facilitator should be increased to moderator because of most students still cannot trust their own group's member for finding problem's solution (Srivastava, 2020), (3) the professional development can be taken from real-life sample (in this case by inviting alumni as guest lecturer), thus it can increase students' motivation. However, there are some important things to avoid in this collaborative PBL implementation, which are: (1) forming of collaborative group should not be handled by students themselves, because of lecturer must be included actively in order to avoid miscommunication between them, (2) lecturer should not let students in group start communication independently, because of they should be facilitated at first to grow trust between them, and (3) students can not present their work just in final term, because they must be monitored their progress step by step to avoid plagiarism or instant sample from internet.

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