PROGRESS OF IMPLEMENTING PROJECT-BASED LEARNING IN HIGHER EDUCATION

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ABSTRACT
Project-based learning promises to prepare students for professional and personal success. Many studies have demonstrated the effectiveness of project-based learning (hereafter referred to as PBL) in universities. However, there are potential obstacles awaiting this model. To help lecturers implement PBL effectively to achieve good results and ensure active student participation in the learning process, we designed a process for implementing project-based learning at the undergraduate level. With the perspectives of previous scholars on the stages of PBL, the process consists of three phases: project preparation, project implementation, and project evaluation. At each phase, we describe the activities of both lecturers and students and offer recommendations on how to best carry them out.

Keywords: Project-based learning, Higher education, Implementation process, Learning project, Teaching plan.

1. INTRODUCTION
University is a crucial phase for students. As soon as they become a freshman, they have to start preparing for life after graduation. Therefore, higher education institutions are responsible for providing a meaningful education to students, contributing to a successful future. To train highly qualified human resources that can meet the increasing demands of the labor market, higher education institutions must not only provide knowledge to students but also equip them with the necessary hard and soft skills of 21st century citizens. However, in traditional classrooms where the lecturer delivers knowledge and students receive information, these goals are still far away. Besides, placing emphasis on teaching theoretical knowledge will create a gap between what students learn at university and what they need for work. In order to achieve the goal of fostering a meaningful education for students, higher education institutions need to create opportunities for students to solve real-world problems and widen their knowledge in practical professional settings. PBL is seen as a promising solution for students to prepare for life after college. The increasing number of studies supports the application of this model in schools to encourage learners, promote collaborative learning skills, and boost learning efficiency. Many experimental studies of PBL on learner outcomes showed that PBL has a more positive impact on learners' academic achievement than a face-to-face instructional approach when learners are encouraged to work on projects and product development (e.g. Affandi & Sukyadi, 2016; Alsamani & Daif-Allah, 2016; Barak & Dori, 2005; Boaler, 1999; Brassler & Dettmers, 2017; Helle et al., 2007; Mohamadi, 2018; Stefanou et al., 2013; Torres et al., 2019; Wu et al., 2018).

While PBL in higher education has proven to be an effective method for planning life after graduation, implementing it – or even improving the entire curriculum – will be challenging. If done well, PBL will yield excellent results, conversely, if PBL is not done properly, students may end up carrying out projects for teachers rather than themselves. PBL is a learning-by-doing approach in which students assimilate concepts through actions. It can be turned into a project in which students learn first and then do, or it can be turned into entertainment or a supplement to the "real" program. Hence, developing a high-quality PBL implementation process is essential. In this research, we outline the steps in PBL implementation at the university level to pursue important and specific educational goals.

2. PHASES OF PBL

There are different views on the division of stages in the PBL process. For instance, Karl Frey (2012) designed a basic pattern of the project method with the following steps: project initiatives, discussion, planning, implementation, conclusion along with frequent inspection, discussion, and adjustment during the PBL; Kilpatrick (1918) recommended a process consisting of project ideas, planning, implementation, and assessment, etc.

From the viewpoints of researchers, it can be seen that the process of PBL implementation includes many steps from proposing project ideas, assigning tasks, dividing groups, assigning work to supervision (monitoring and making timely decisions), checking, assisting learners in the whole process and evaluating results. Selectively inheriting the views of previous scholars, we build PBL in higher education with 3 phases (project preparation, project implementation, and project evaluation).

2.1. Project preparation phase

At the project preparation phase, lecturers and students have to:

- *Identify a problem*: A problem exists when there is a difference between reality and expectation. Solutions are the key to narrowing this gap. The problem often arises from a question or a doubt. It can be theoretical or practical, social or technical. Its description can be brief or abstract. Lecturers need to pose problems for appropriate learning targets. The problems in PBL should match the learners' capacity. Avoid creating problems that are too acute and beyond students' understanding.

- *Design a learning project:* After defining a problem, it is necessary to build a solution project. The project must go beyond the solutions that students are familiar with, thereby requiring them to make efforts to complete it within a certain period of time. Projects may be initiated with the ideas of teachers, students, or student groups. Students are the ones who choose the project, but they must ensure that the content is suitable for educational purposes, learning programs, and real-world conditions.

Teachers will guide students on how to propose ideas and design learning projects to accomplish the teaching objectives in terms of knowledge, skills, and attitudes.

An extremely important activity of lecturers to support students' project design is to create a set of guiding questions. Through prompts and open-ended questions, students have to think and come up with solutions. For example, repeatedly asking the question "why" can assist students in determining the root cause of a problem and devising a solution. The following is an example of how guiding questions help find out the primary reason of the problem "Why do most graduates prefer to work in cities?"

Why do most graduates prefer to work in cities?

=> Because there are more job opportunities in urban areas than in rural areas.

Why are there fewer job opportunities in rural areas than in urban areas?

=> Because most agencies, companies, factories, enterprises, etc. are located in cities instead of the countryside.

Why are agencies, companies, factories, enterprises, etc. rarely located in rural areas?

=> Because there are not enough favorable conditions for the operations of agencies, companies, factories, etc. in rural areas.

What are the favorable conditions for the operations of agencies, companies, factories, enterprises, etc.?

Instructors can provide some tools and guide students to synthesize, evaluate, and eliminate projects to come up with the most optimal and feasible problem-solving projects. Frank and positive discussion during the project proposal process helps stop individual and local thinking.

- *Select a project:* After gathering student-designed and lecture-proposed projects, lecturers divide groups, assign tasks to them, and more importantly, create conditions for students to choose their group.

- *Develop a project plan*: Teachers instruct groups how to carry out projects, in which students need to accurately define the topic, objectives, assignments, budget, time, and implementation methods. The project teams can create a mind map of topics and concepts related to the problem, localize what they already know, identify what needs to be acquired, and organize a list of knowledge that needs to be supplemented in order of importance and urgency. Next, the groups discuss knowledge that all members must acquire as well as knowledge that can be divided among members to learn. At this stage, students are required to be self-reliant and collaborative to build group plans. The project plan should be concise and easy to present to instructors and relevant entities, especially those responsible for approving and agreeing on project implementation. After the presentation, the project teams can continue to refine and modify the project plan if necessary.

2.2. Project implementation phase

At this phase, students work in groups and individually according to the plan. Lecturers play a role in instructing and supporting students. Students need to focus on performing activities such as researching documents, synthesizing information, conducting experiments, exchanging and collaborating with group members.

Project implementation is often the most time-consuming and resource-intensive phase. Teams must not only execute pre-planned tasks but also deal with unexpected incidents. Lack of resources, knowledge gaps, personality conflicts, etc. are all potential triggers for crises. Therefore, discussions and plan adjustments will require harmonious coordination from the group leader. The responsibility of the team leader is to ensure team unity, avoid communication conflicts, orient the team towards common goals and keep track of the progress and quality of each assignment. This position can be chosen in many different ways, but it should be changed by projects to enhance the experience of each student.

During the project, teachers need to respect the groups' plan, create conditions for students to exchange, collect documents, and search for information. They also need to give up the habit of controlling the classroom and put more trust in learners and be more comfortable with "wrong turns" students make on the path to completing the project. Lecturers should shift their role from teaching to guiding, becoming a companion for the groups.

2.3. Project evaluation phase

There are two main trends in assessment: summative assessment and process assessment. While *Summative Assessment* evaluates learners' capacity or school effectiveness based on evidence of their achievements, *Formative Assessment focuses* on collecting information on learning effectiveness and feedback from learners to improve the learning process. The main purpose of assessment in PBL is enhance quality, not to judge it. For this reason, the focus should shift from summative assessment to formative assessment when implementing PBL. Continuous evaluation needs to be done throughout the process to adjust the teaching activities of lecturers and the learning activities of students.

However, ensuring that formative assessment is used for the correct purpose is not an easy task. It is firmly believed that semester exams are also a form of formative assessment because they provide enough information to modify grades for the next time. In fact, it is a form of summative assessment at each stage of a process, not a formative assessment. Semester exams only reflect the degree of overlap in exam style and give little information to improve and promote the learning process. For PBL, scores are absolutely not the finish line. Students' projects may succeed or fail, but they definitely learn a lot in the process. If the initial hypothesis is wrong, students can conclude that it was wrong, meaning that the knowledge has truly become their own. If students fail to prove whether their hypothesis is right or wrong, they also gain experience for the next projects. Therefore, if we only rely on grades, it is impossible to reflect unquantifiable efforts.

In the PBL implementation process, teacher assessment, peer assessment and self-assessment are equally important. To collect diverse and continuous feedback from students to improve education quality, instructors need to ensure transparency in assessment measures and in the assessment process. Moreover, the classroom environment needs to be open and cultivated on trust between teachers and students.

For supporting the assessment, lecturers need to develop a specific set of assessment tools for assessment forms including teacher assessment, peer assessment, self-assessment, and building a comprehensive assessment plan.

At the project evaluation phase, a representative of each group reports the outcomes of their project, introduces project products to the entire class, and participates in questions and answers session. Then, instructors and students conduct assessments below:

**Teacher assessment*: Instructors evaluate students' entire project process and the products and give feedback for future projects. They should use student observation sheets to evaluate the process of groups. With this evaluation method, instructors should develop appropriate evaluation criteria based on the teaching targets and unique characteristics of each project.

*Peer assessment: Students in the same group provide feedbacks to each other after the groups have reported and presented their project products. Lecturers guide students to design and build their own evaluation criteria.

*Self-assessment: Students self-assess their knowledge, skills, and attitudes (by writing a personal report) after the project. This method is done after the report and introduction of project products. Finally, lecturers announce the results of the overall assessment for each participant (a reward is given if any). Also, they request groups to correct shortcomings in project products and suggest working on new projects.

3. DEVELOP A TEACHING PLAN

To effectively apply PBL and guarantee active student engagement in the learning process, teachers need to make a teaching plan. Teaching planning is a critical task that first affects the outcomes of the subjects. At all stages of PBL, lecturers must closely adhere to the unit plan to monitor and check activities, the progress of students' projects, and detect errors for timely adjustments to reach the goals.

The teaching plan entails:

+ *Determining objectives*: The goal of PBL is not to perfect the final product or commercialize the product, but to enable students to obtain knowledge and skills, especially learning and professional research attitudes through the process of understanding the problem, developing solutions, and implementing the project.

+ *Setting conditions for project initiation*: Lecturers need to prepare essential educational equipment and documents to support students (textbooks, reference materials, plan samples, project tracking books, work assignment sheets, observation sheets, evaluation sheets, etc.). In addition, they need to connect with affiliated forces (school lecturers, administrators, parents, outside agencies and organizations, etc.) that students need during the project.

+ *Introduction to PBL*: Instructors present the steps and one example of project-based learning, teach essential project skills, and provide materials and instructions for using supporting documents. The introduction to PBL only needs to be done at the students' first project. In subsequent projects, instructors do not need to perform this activity.

+ *Implementing 3 PBL phases*: project preparation phase, project implementation phase, and project evaluation phase.

4. CONCLUSION

Project-based learning focuses on developing in-demand skills for practical contexts instead of traditional methods that emphasize memorizing facts and figures. PBL is a promising approach to embracing the future. PBL creates a safe environment where students can experiment, fail, learn, and succeed. In a project-based curriculum, students are guided by instructors rather than being directed. They are in charge of their own learning by dealing with real-life and tangible problems through open-ended projects. This form of active learning in higher education helps students hone important skills and abilities, such as collaboration, communication, problem solving, confidence, leadership, etc. Students who have experienced active learning in higher education through PBL have the opportunity to obtain the skills they have learned during the project and transfer them seamlessly into their careers after graduation. Thanks to these high-impact hands-on activities, students not only graduate with confidence and a sense of purpose but are also fully prepared for whatever the world throws at them.

The benefits of PBL in higher education are countless. However, it is difficult to get started with PBL. To effectively implement PBL in universities, lecturers need to follow a reasonable process. This article presents a process for teachers to apply PBL well and ensure active student engagement in the learning process. The three-step process here is only relative. In fact, the steps can alternate and penetrate each other; teachers can also add or exclude a specific activity in that process to suit the circumstances.

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