Students’ Perceptions on Problem-based Learning Implementation: A Case Study at an Indonesian Medical School

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Problem Based Learning has been implemented worldwide, with no exception including Indonesia. Faculty of Medicine, Universitas Indonesia (FMUI) has implemented PBL as one of learning approaches since 2005. Therefore, we would like to evaluate the effectiveness of this program by exploring students’ perceptions on PBL implementation. A single case study with multiple unit of case analysis was conducted. Two to six students representing the 2nd, 4th, 6th, 8th and 10th semester of FMUI students were recruited voluntary to participate in this study. A structured focus group discussion (FGD) was moderated by one to two staff members. Data collected were then transcribed, coded, categorized and analysed qualitatively to construct a concept. Students’ understanding of PBL was still varied. A concept of PBL implementation at our institution was developed based on students’ perceptions. We can not adopt PBL implementation in the same way as the Western countries institutions did. To implement PBL successfully, we should prepare and consider many aspects including cultural background.

Key words: students’ perception; PBL implementation; cultural background.

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INTRODUCTION

Many references shows the importance of several aspects in PBL implementation. Majority of them points out that student, facilitator, trigger, administrator, supporting resources and assessment are important in implementing...
PBL successfully. In addition, the significant role of PBL as a part of the curriculum can not be neglected.\[4\]

The facilitators should understand the aim of PBL which is focused on student self-directed learning.\[4\] They play an important role in directing the students to obtain sufficient knowledge in line with the predetermined learning objectives. Facilitators should understand the trigger prior to the discussion process and apply an appropriate facilitating style depending on the student learning progress. To improve the students’ performance, facilitators are responsible for maintaining the group dynamic, giving a constructive feedback, assessing student performance and giving an appropriate intervention when required.\[4\]

The trigger is also an important element in PBL. A well-constructed trigger can motivate students to explore knowledge in depth and breadth. The trigger should align with the objective and level of education; realistic, reasonable for available tutorial time and interesting.\[4\]

Another crucial aspect that determines the success of PBL implementation is the group dynamic. Tutorial group process is influenced by the facilitators, problems and the students.\[5\] In terms of the student role, students must have a sufficient understanding of PBL philosophy, so that they can achieve the learning objectives.\[6\]

Assessment in PBL should really assess the PBL process using particular instruments. This instruments includes student participation, preparation, critical thinking, communication skills and group skills.\[4\]

As part of the curriculum, the institution should allocate an appropriate time schedule for PBL. At the University of Hong Kong, thirty percents of the scheduled curriculum is dedicated for PBL activities. Furthermore, supporting learning resources, such as comfortable tutorial room, learning media and technology should ensure that all learning activities run well and motivate student learning. Facilitators should be well trained and understand the learning objectives. In addition, a committee is appointed to review the trigger, evaluate and monitor the learning activities.\[4\]

Indonesia as a part of Asian countries has a different culture compared to western countries, the origin of PBL. The culture may influence the teaching and learning activities from primary to higher education. Therefore, it may also influence the success of PBL implementation. In Asian countries, the relationship between student and teacher is more formal and stiff. Most of the students are shy, afraid to express their opinion and have lack of confidence. On the other hand, teachers expect students to respect them and they tend to become authoritarian.\[7\] Studies on international perspectives on problem-based learning revealed that culture such as language proficiencies gave a large impact on the program implementation.\[8\]

At the Faculty of Medicine, Universitas Indonesia (FMUI), PBL as one of the learning approaches, has been established since 2005. Tutorial is held twice a week, two-three hours per session. Each facilitator has the responsibility to facilitate nine to ten students. In every discussion session, one student is appointed as a group leader, one student as the secretary and others as group members. After the first discussion session, students have to do self-directed learning by exploring knowledge from various learning resources (individual assignment) for 2-3 days. At the second session, students share their knowledge, thereafter they present the results at the plenary session. The plenary session is addressed to clarify and to confirm the knowledge they obtained; some resource persons are invited to attend this session.

Other learning activities such as lectures,
laboratory practices, basic clinical skills, e-learning, etc. are provided to enrich student’s knowledge and skills. Triggers are developed by a committee consisting of academic staff of pre clinical and clinical years. The committee is also responsible for preparing and organizing the schedule, learning resources, assessment, communication and coordination with resource persons. Lecturers and facilitators are assessed by the students via internet or by filling up a paper-based questionnaire. Finally, the committee should monitor and evaluate the module implementation. In addition, the faculty provide a counselling team and staffs who are responsible for student academic and non-academic progress/problems during their study.

METHODS

Population and samples collection
A single case study was performed to analyse the students’ perceptions on PBL implementation at FMUI. Population under study was all students of FMUI. Samples were collected by purposive sampling of students representing the 2nd, 4th, 6th, 8th, 10th semester students, each consisted of two to six students. Data were collected by conducting a structured focus group discussion led by one to two staff members; discussions were conducted separately based on students’ level of education. In addition, document analysis was done by examining documents related to the implementation and evaluation of PBL.

Data analysis
After the recorded FGD was transcribed, the data was coded and categorized according to the theme emerged. Thereafter, we conducted a contrast comparison study to narrow down some categories to a small number of categories. Finally, after interpreting the data, we established concepts based on categories identified during the study. Students were asked for fulfilling the informed consent. Ethical consideration was made by the Ethics Committee of FMUI and Faculty of Medicine, Gadjah Mada University.

RESULTS

Based on the FGD transcription, we identified five major categories. Categories included: understanding of PBL (5), preparation (2), implementation (5), evaluation (3) and suggestions (4) (Figure 1).

Understanding of PBL
According to the students, PBL was different from learning at the high school. But it seems that the way students learned at the high school affected their learning at the faculty. They expected to be given information (spoon-feeding) rather than learning by their own. This statement was expressed by most of the students, although, others revealed that PBL is a student-centered learning. In addition, some students stated that PBL is an active learning process and it activates their prior knowledge.

It was observed that there were varieties of students’ perceptions on PBL. In general, the students believed that PBL is learning by using problems, exposed at the beginning of the learning process. According to some students, PBL also emphasized on what will be learned, why/how it happened, how to think. Others mentioned that PBL is an independent and contextual learning. The 10th semester students assumed that their understanding of PBL and knowledge increased with their level of education. They realized that PBL should be more focus on basic sciences or concepts.
Students found that PBL is intended to identify and solve the problem as expressed in this following conversation:

“...., we find the problem from a case, we solve it during discussion” (F1R2, lines 1-3, paragraph 50).

“From the beginning, I already understood PBL ... I can imagine that later on, we will be given a problem to be solved. ... and we are obliged to look for information as much as possible, ...”

Figure 1. Students’ point of view on PBL implementation
“... PBL is ... because we are facing a problem, so we are motivated to learn and from what we have learned, we try to find the way to solve the problem” (F5R3, lines 1-7, paragraph 20).

Students mentioned about the real-world context of PBL, they understood its application in their future profession:

“... The first step, for example is the identification of the problem, after that.. make a hypothesis as it might be applied later on when we are in the real world” (F2R1, lines 13-17, paragraph 11).

Almost all students confessed that they understood and remembered all the discussion steps, but most of the more advance students could not mention all steps completely in appropriate sequences. Students were of the opinion that during discussions they exchange ideas, share knowledge and complement each other. They played a greater role in group dynamics.

In term of the role of facilitator, more advance students assumed that not all staff understood PBL appropriately. Students perceived that a good facilitator has to direct students during discussions, be objective, able to communicate, has sufficient knowledge and provides feedback. While others assumed that a good facilitator has to understand and is able to motivate students, not too active or passive in assessing students. Opinions of a good facilitator by other students indicated that students wanted to be spoon-fed by their facilitators by giving additional information.

Some students prefer not to be interfered by facilitators during discussions, whereas others disagreed, as expressed by the 2nd semester respondents:

“For me, it is better to have intervention, so we know what we have to learn” (F1R1, lines 1-2, paragraph 137).

“In my opinion the bad things about a facilitator is one who insisted what should be discussed, ... But, what we would like to learn should be up to us ...” (F1R5, lines 1-5, paragraph 128).

In regard of a good trigger, 4th semester students revealed that a good trigger is a trigger that leads to a disease/specific diagnosis, but not too much focused on clinical aspects. Moreover, 6th semester students assumed that a good trigger is a trigger presented in a clear statement. Students told that it is better to give a structured format of a simple clinical case for the first year students.

**Preparation**

Some students said that they were well prepared before learning activities, while others were not well prepared, depending on their time availability. Preparation before discussion was usually done by reading the guide book and trigger or searching the internet.

**Implementation**

The students were divided into small groups based on their grade point average (GPA). Students with high or low scores were distributed equally to each group. Thus, the quality of students among groups was expected to be homogenous. Students found that compared to lectures, discussions motivate them to learn more. During discussions, students felt that other group members explanations were understandable, although students of the 8th semester trusted more the resource persons. Group leaders directed the discussion process and influenced the group dynamics. Students (6th and 10th semester students) revealed that they were
interdependent and worked collaboratively during tutorial sessions (8th semester students).

The 6th semester students thought that the individual assignment was not burdensome, while 10th semester students argued that the burden of the assignment was heavy, but not as heavy as in clinical stages. Students prioritized making assignments than other learning activities. They spent more time in doing their individual assignment. The more advance students seemed to be able to manage their self-study time better than the junior students.

Some students stated that the assignments helped them in their exam preparation. The assignments were distributed among the students according to diseases and emphasized on organ involvement. Students’ learning was based on disease entity, discussions merely led to clinical diagnosis.

The role of facilitators was predominantly seen when students made hypotheses, analysed the problem, determined what has to be learned. Even though, students preferred to be freely in deciding what to be learned. Not all facilitators provided direct feedback on students’ performance and informed the learning resources.

Although most of the respondents understood that there was no difference between medical and non-medical facilitators, but they preferred medical facilitators as mentioned below:

“... when the facilitator is not a medical doctor, he/she usually lacks the ability of directing the discussion process” (F5R3, lines 1-2, paragraph 79).

“... the medical doctor ... able to understand well, how to do .. analyse the problem ...” (F5R4, lines 1-4, paragraph 80).

In contrast, other students mentioned the following statement:

“So, whether the facilitator is a medical doctor or not, it’s not a problem, as long as he/she can stimulate group dynamics and can also be a resource person who does not need to be too directive, only guides what students should do and know ....” (F4R4, lines 11-16, paragraph 19).

Triggers which were given at the first week of the module mainly emphasized on physiological state, followed by triggers directed to pathological conditions. Students had a better understanding of the trigger after a period of time.

Other learning activities such as lectures were considered as having the same importance. Lectures helped improving the understanding of certain matters and were useful for confirming the acquisition of knowledge in discussions; although not all discussions’ topics were covered in the lectures.

Each student has a supervisor who is assigned to guide students’ academic and non-academic aspects. Almost all students did not understand the role of the supervisor, most of them met the supervisors only for administrative purposes. Students preferred to communicate with friends/seniors when faced with academic difficulties. As for the non-academic issues, they tended to talk with their parents or friends.

In terms of utilization of facilities, students used their own textbooks; they visited the library for doing their assignments, looking for references and discussing with friends. Students rarely used the computer lab due to technical difficulties. Students guide book was useful as it contains learning objectives, the scope of the discussion, topics, sub-topics, triggers, schedule, a list of facilitators and resource persons etc.

The following obstacles were also encountered
in the implementation of PBL:

**PBL tutorial**

Concerning tutorial, students required a greater effort. Discussion was limited only to the learning issues of the trigger and the guidance, too much assignments and time consuming. Students only understood their own assignments.

In the second session, most students only read the assignment when shared their knowledge, while others preferred to use electronic media. Fourth semester students pointed out that they were lacking the basic concept and the number of discussion sessions was too much; students were bored, and therefore they wanted to finish the discussion as soon as possible.

Some students noted the importance of prior knowledge for the tutorial sessions. Even though, they felt that they were lack of prior knowledge; the lecture as their prior knowledge was not always associated with the trigger on the tutorial process.

**Other learning activities**

Some plenary sessions impressed the students. However, most of the plenary sessions were not effective, tended to be boring, resulting in students reluctant to ask and decrease their motivation. Students need to have more feedback and prefer to have minilectures from the resources persons (spoon-feeding).

In general, course materials were too much, a lot of rescheduling, poor lecture delivery, too advance and less attractive lectures. According to the students, the anatomy lectures were insufficient and the lab practice was not well-organized.

**Teaching staff**

Facilitators were not uniform in directing discussions. Some facilitators insisted that students should achieve faculty learning objectives and gave information directly to the students.

The staff attendance in plenary sessions were low, the number of group presentations were too many. As a result, there was limited time for having feedback from the resource persons.

**Trigger**

Fourth semester students stated that some triggers were too broad, ambiguous, not align with the subject, not clear, less specific, confusing, and too many; it more focused on clinical aspects. Similarly, the 2nd semester students concluded that some triggers was not well-constructed. These statements were in contrast with the 6th semester students who revealed that triggers were good and clear, while the 10th semester students stated that the triggers match with the learning objectives.

**Facilities and infrastructure**

Some facilities were still inadequate e.g., lack of up to date text books, limited library and internet access, lack of audio visual system and facilities maintenance etc.

**Evaluation**

**Student assessment**

Almost all students mentioned that the assessment of the discussion process was not uniform, subjective and unfair as implied from the discussion below:

“... if facilitators give marks above eighty, he/she should give the reason (why they give more than eighty), so (to make it easier) they always gives seventy...” (F2R1, lines 13-17, paragraph 91).

Summative exam was considered objective, laboratory practice test was not a problem, but there was too many OSCE exam material for basic clinical skill. There was a constraint on the
summative exam as students only learned from notes and topics listed in the students’ guide book. In fact, the exam only consisted of questions from lecture notes.

We found that student achievement in test scores were considered to be more important than the value of competence achievement. In addition, students like the progress test because after the exam they were given the items with the answer keys.

Program evaluation

Competency-based curriculum with student centered philosophy is considered good. More advance students stated that the application of PBL was aimed to motivate them to learn more, as mentioned below:

“... according to what I have experienced with PBL... it is good. It stimulates me to explore more or learning more” (F5R2, lines 1-5, paragraph 2).

Students revealed some benefits of PBL, included: motivate students to be more diligent and creative; improve their ability to argue and enhance their curiosity. The 10th semester students expressed that PBL increases clinical reasoning skills; PBL is an integrated learning and is useful when students are writing a manuscript. Instead, passive students will be left behind.

We found some contradictory statements such as: PBL motivate students in elaborating knowledge in depth, as suggested by a fourth semester student, while others argued that statement. PBL tutorial deepened the course material, but it depended on the role of facilitators in guiding the students.

Some students regarded that by using PBL as a learning strategy, they were used to think critically, whereas others had the opposite opinion.

In contrast, 10th semester students were of the opinion that PBL is difficult, study time is limited, were not confident with the future application of PBL in the clinical phase. Students’ expectation in learning basic sciences was not met. They felt that during the preclinical year, they were too busy to deal with cases concerning the patient, not to the problem.

Some students assumed that the learning objectives were achieved, while others did not agree. Document analysis supported the fact that not all learning objectives were achieved through PBL tutorial. Some other learning objectives were expected to be covered by other learning activities.

Other opinions argued that the learning objectives were not clearly stated and confusing.

Students doubted the material coverage. Students found that they gained low theoretical knowledge retention. In fact, PBL is expected to produce a good retention of basic sciences to guide graduates when dealing with patients in the future profession.

Students preferred the culture of spoon-feeding i.e. emphasize receiving information rather than finding information themselves. Anyway, the 4th semester students said that this kind of learning had a positive impact, as students are required to look for information needed and develop adult learning.

According to the students, although it takes time to understand the lecture, they still need lectures to complement knowledge acquisition. Lectures supported the discussion process and increased knowledge, especially on basic sciences. Laboratory practice helped students to understand sciences; knowledge retention in laboratory practice was good. Laboratory practice in physiology made students under pressure, but it impressed them.
Suggestions for improvement

According to the students, there are four major areas that need to be improved:

**Resources**

(1) Provide up to date references and internet access, so that students can learn more in depth and breadth, (2) Enhance facilitator role in facilitating and evaluating group discussion to ensure the success of tutorial process and objective evaluation, (3) Develop additional discussion sessions on basic sciences to improve basic science coverage, (4) Socialize students’ counseling system, so that students have better understanding on its system and benefits.

**Learning activities**

(1) Reduce the number of triggers, since too many triggers make them get bore. They also prefer triggers that relate to the lectures’ material, so that they can understand the knowledge better, (2) Give more freedom to the students at the discussion session since some facilitators push students too hard in achieving the learning objectives, (3) Reorganize independent study time schedule to make it more effective and efficient, (4) Develop other assignment format to be more attractive and easy to understand, (5) Reduce individual assignments, to lessen students’ burden and (6) Improve plenary session effectiveness by limiting student presentations and giving more feedback.

**Evaluation**

(1) Provide feedback on discussion process scores, so that students know their progress, (2) Conduct a peer-assessments system to enhance objectivity in students’ evaluation, (3) Provide keys for each examination as a feedback and (4) Improve test results reports via internet access in a more detail manner.

**Policy**

(1) Give additional time allocation for anatomy, due to lack of knowledge and laboratory practice on anatomy, (2) Limit additional materials from the university that are less related to medicine, since students feel that those materials are not giving much benefits for them.

**DISCUSSION**

**Understanding of PBL**

From this study, we found that students’ perceptions on the understanding of PBL varied, even though their understanding of PBL increased according to their level of education. Time allocated for self-directed learning was not effectively used by the students. A study by Hendry et al. found that students defined PBL as working together (collaborative) to solve and understand the problem, but unfortunately they lack the emphasis on independent/self-directed learning. Therefore, faculty members should assist students, so that they are able to regulate their own learning.\(^6\)

Many students perceived PBL as problem solving. Actually, PBL is the learning of a process that leads to understand or solve problems. The learning process begins with an exposure to a problem.\(^9\) PBL is not the same as solving the problem, but the problem is given to be used as a trigger for the learning process, to improve students’ knowledge and understanding.\(^10\)

Students’ perception about a good trigger also varied. They prefer to have a clear trigger which directs on a clinical diagnosis; even though they felt that the triggers were too focused on clinical sciences. The number of physiological trigger was insufficient. At higher educational levels when students have been exposed to clinical experiences,
the use of triggers with unstructured format is preferable.\([11]\) Other stated that the trigger should be ill-structured, so it can motivate students better, improve the application of clinical reasoning, build knowledge in a contextual manner and stimulate an independent study.\([11]\) According to the students, trigger materials have to be covered in the lecture. Actually, it should be avoided, since it will demotivate students in exploring new information.

Since students have a lack of prior knowledge, they prefered to have lecture material to be given before the discussion process. In relation to prior basic knowledge obtained, one disadvantage of medical students in Indonesia is due to different admission systems. Students are recruited to the college directly from high school. Basic knowledge in the medical field is very limited. This situation is different with medical education abroad where students have to complete bachalaureate progam prior to medical school progam or enter the pre-medical school program.

**Implementation**

The new paradigm on medical education are the three C and one S (constructive, collaborative, contextual and self-directed learning).\([2]\) All of these are covered within group discussions explained by the students. Students learn to work together in a small group discussion (collaborative). During their independent study time, they do their individual assignments after the first discussion session. Students organize and control their own learning (self-directed learning). In the second discussion, students build knowledge based on informations gathered during the discussion session (constructive). Knowledge is then linked back to the trigger given, then applied in clinical practice and future life as a physician (contextual).

In PBL, a good facilitator led the student to achieve the learning objectives.\([10]\) Facilitator guides students, gives advice, keep the discussion on track; but he/she does not provide information.\([12]\) In fact, we found that some facilitators gave information directly to the students and students preferred to be spoon-fed by facilitators.

The triggers were not well-constructed and did not align with the students’ educational level. It may be due to misconception of PBL, the trigger was developed with emphasis on diagnosis and clinical aspects (problem solving) without considering the students’ level of education. It can also due to the lack of facilitators guidance or misunderstanding of their PBL philosophy as revealed by the students.

**EVALUATION**

**Students’ assessment**

Students felt that facilitators were not objective in giving discussion scores. A similar study by Bollela et al. showed that not all facilitators can assess the students properly; therefore students are less motivated to learn.\([13]\) Theoretically, the facilitators understood the purpose of the assessment in PBL, but in daily practice, they scored it as a conventional learning. Other difficulties in assessing students was the lack of ability in establishing objective criteria for assessing the student performance. Nevertheless, there were facilitators who understood the tutorial process well and gave marks using a good judgment.

Although the evaluation system seemed to be less objective, supporting data showed that students’ performance in the discussion process was high. Unfortunately, if we examine the progress test’ results, it showed that the cognitive competence achievement have not fulfilled the expectation. The average score was still low; however it increased progressively from the lower
level to the higher level of education.\textsuperscript{14,15}

**Program evaluation**

In PBL tutorials, students must actively participate, determine their learning issues and look for answers themselves. The teaching staff should become more open minded, allowing students to express their ideas. PBL can be implemented at Asian countries, as long as the institution provides a convenience learning environment.\textsuperscript{7} This statement is supported by Gwee.\textsuperscript{16} According to him, the application of PBL can cause serious implication in communication style of Asian people who dominated by cultural background. The success of PBL can be achieved by creating supportive and conducive learning environment.\textsuperscript{16}

As in Indonesia, the younger should respect the older people. Students are not taught to participate actively in the learning process. Teaching and learning at high school in Indonesia did not fully support the PBL tutorial process. This situation may give impact to the way of students learning at school. Fortunately, nowadays the education systems are changing. Starting from the elementary school, the education is based on students’ active participation. The government instructed all educational institutions to develop competency-based curriculum with emphasis on student-centered, self-directed learning. Although, since Indonesia is a country which comprises of thousands islands where limited resources and diverse educational quality level are still problems; it is difficult to implement student-centered, self-directed learning at all areas. Students still use to get information directly from the teacher, so that they become more dependent. It especially occurs at under developing area where the learning environment is insufficient and resources are limited. To improve the quality of human resources at under developing area, nowadays every government university should recruited students from all over Indonesian areas. This situation may give impact to the quality of students who are accepted at our institution. Moreover, the characteristics and culture of students recruited from under developing areas may not be suitable with the new learning approach. They may not use to learn as other students who come from more developing areas. Their cultural background may also affect the way they learn, interact with people, express their opinion etc.

We found that students doubt whether they have obtained sufficient knowledge. In the other hand, facilitator also has no confidence in term of material coverage of the students. Therefore, some of them give the information directly to the students, instead of stimulate students to explore knowledge by themselves and let students control their own learning.

Literature study concerning the challenge of PBL implementation at several countries revealed that in Thailand they made an adjustment on problem construction, so that it was suitable with their cultural background. They also challenged with available textbook which is written in English.\textsuperscript{8} Other study showed that Asian students challenged by hierarchical problems, whereas middle-east students faced with uncertainty and tradition when apply PBL.\textsuperscript{17} Ethnic and gender have an important role on PBL. Heterogeneity and diversity give a positive effect on the small group learning activities outcomes if practiced for a longer period of time.\textsuperscript{18} In nursing education, learning is influenced by culture, uncertainty, English language proficiency, students’ prior education, learning resources, gender and achievement.\textsuperscript{19}

This study has a limitation as the presence of the 6\textsuperscript{th} semester students was only two out of six students invited.
CONCLUSIONS

There were various students’ perceptions on PBL implementation at our institution. However, students of the higher level of education understood more the benefits of PBL, managed better their self-study time and gained more knowledge progressively. Several points should be considered when implementing PBL, including students’ cultural background.

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