

# Exploration of Medical Students' Perception Towards PBL Tutorial Modified with Individual and Group Assessment

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## ABSTRACT

**Background:** Problem-based learning (PBL) has been implemented at the Faculty of Medicine, Universitas Diponegoro, since 2001. The model was later modified to enhance student engagement by incorporating individual and group assessment. Students are assessed not only on their knowledge but also on their skills, attitudes, and active participation in discussions, which contribute to their overall block assessment.

**Aims:** This study explores the students' perceptions of implementing the modified PBL.

**Methods:** We conducted a qualitative study using six focus group discussions (FGD) involving 36 students from the 2021, 2022, and 2023 cohorts.

**Results:** The study identified five opportunity themes and five challenge themes related to the modified PBL implementation, along with several student recommendations for improvement. The opportunities include more structured individual learning, increased active participation, group reports serving as practical and comprehensive learning resources, and the development of collaboration and leadership skills. Meanwhile, the challenges include delays in distributing PBL scenarios, an imbalance in group participation (e.g., overly passive or dominant students), the individual report becoming burdensome during exam periods, and the limited relevance of individual assessments in discussions. Nonetheless, students demonstrated awareness of these challenges and proposed constructive suggestions for improvement.

**Conclusion:** The findings suggest that students benefit from the modified PBL in various ways. However, it can also potentially threaten the internal motivation of a self-directed learner.

**Keywords:** problem-based learning, student-centered learning, tutorial, summative assessment, active learning

## PRACTICE POINTS

- The implementation of PBL has been found to vary significantly in terms of discussion activity.
- Students can well receive the modification of PBL, which aims to increase student activity and understanding, in the form of assignments to make individual and group reports.
- Students' recommendation to replace individual assessments during discussions, become group assessments is deviated from the original purpose of personal assessments, namely to assess aspects of communication skills and student professional behavior.

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**BACKGROUND**

Problem-based learning (PBL) is a learning method that uses scenarios (cases) by integrating various disciplines.<sup>1</sup> This method can also develop mindsets, help integrate knowledge from various fields of medical science, and provide an overview of problems that are often encountered when graduating as a doctor.<sup>2</sup>

The application of PBL in the Faculty of Medicine in Indonesia is increasingly widespread, along with the implementation of the Competency-based Curriculum, which is based on the Indonesian Doctor Competency Standards (SKDI).<sup>3</sup> Research at the Islamic University of Malang found a positive relationship between PBL and student academic performance: the more PBL implementation, the more students achieve.<sup>4</sup> PBL helps students understand cases and helps them understand basic science, so that students do not find it challenging to analyze the problem. This habit of searching for lecture materials fosters a positive behavioral pattern, enabling students to think critically.<sup>5</sup> The PBL strategy has also proven effective in improving students' critical thinking skills.<sup>6</sup> A Chinese study comparing Lecture-Based Learning (LBL) with PBL reported that PBL was more effective in various aspects, including theoretical knowledge, attitudes, skills, and students enthusiasm, than LBL.<sup>7</sup>

Although many studies report the success of PBL, some studies also indicate that implementing PBL can be challenging and encounter several obstacles. Research at Tadulako University reported that students faced obstacles in implementing PBL due to their inability to manage time effectively.<sup>8</sup> Sometimes, students feel lazy, delay their study time and assignments, and feel confused about finding the proper references because they perceive the scope of medical material to be very broad. The tight schedule also affects the management of study time when implementing PBL.<sup>8</sup> Research at the Faculty of Medicine, Tarumanegara University reported that most respondents showed demotivation when some group members only contributed a little, thus reducing the effectiveness of PBL discussions.<sup>9</sup> Students who contribute little to PBL discussions may do so for several reasons, including lack of preparation before

the discussion, embarrassment of contributing, fear of explaining things incorrectly or conveying wrong information, low confidence, or lack of interest in the discussion topic.<sup>9</sup> A study in Japan examining 79 medical schools reported that 56 medical schools considered implementing PBL problematic due to a lack of motivation toward PBL material.<sup>10</sup>

Previous research has shown that students would be more active during PBL discussion if they searched for materials given by lecturers beforehand.<sup>11</sup> However, when the materials for PBL cases have already been provided in lectures, this does not align with purpose of PBL, which is for students to independently search for resources, discuss them with friends, and build new knowledge. In 2010, the Faculty of Medicine, University of Riau had conducted a qualitative study by analyzing respondents' answers from a questionnaire in the form of open questions about five benefits and five obstacles felt during PBL.<sup>12</sup> Nevertheless, the researcher acknowledged the possibility of differences in interpretation between researchers and respondents that occurred because data acquisition only came from writing and was not continued with further interviews.<sup>12</sup>

Through PBL, students actively participate in discussions to study cases that trigger learning. In addition to developing problem-solving skills, students also enhance their communication skills. Even though PBL tutorial has been implemented in FK UNDIP since 2001, the preparation of students prior the discussion and participation during the discussion needed to be improved. Therefore, the PBL tutorial was modified by adding assignments that required handwritten individual notes during the self-study phase, an additional individual assessment during the discussion, and a group report as a summary of their discussion, which was also evaluated as part of the group assessment. Assessment during discussion consists of five items: discipline, clarity and coherence of individual report, student activeness during discussion, relevance of students' opinions to the discussion topic, and communication skills (active listening and not dominating the discussion). The group report comprises the key insights from the case discussion with the relevant references. All of the assessments in PBL contribute

to block assessments. This modification has never been evaluated. Therefore, exploring student perceptions using qualitative methods is expected to be a more in-depth evaluation. Thus, the aim of this study was to explore students' perceptions of the PBL tutorial that has been modified with individual and group assessments.

## METHODS

### Study Design

This is a qualitative study with a phenomenological approach to gain a deeper understanding. The individuals' explanation and understanding of their experiences during PBL were explored using Focus Group Discussion (FGD) as a process of systematically collecting information.<sup>13,14</sup> FGD makes respondents feel more comfortable and encourages them to rely on each other when they cannot answer some of the researcher's questions, allowing participants to speak more freely.<sup>15</sup>

### Setting

The study was conducted from April to May 2024 at the Faculty of Medicine, Universitas Diponegoro (Undip), Semarang. The respondents were students from the 2021, 2022, and 2023 intakes. Sampling was conducted using a purposive sampling technique to determine the identity in accordance with the research objectives.<sup>16</sup> Six students with the highest GPA and six with the lowest GPA were selected in every intake. Each GPA group consisted of three male students and three female students. The respondent's code was written in the format XX YY(A/B)-(P/L). XX is an abbreviation of the respondent's initials, YY indicates the respondent's intake year, A indicates the group with a high GPA, B indicates the group with a low GPA, P indicates female respondents, and L indicates male respondents. FGDs were conducted six times, with each FGD comprising six students with high or low GPAs from each intake.

### Data Collection Tools

The research instrument was the researcher herself (KLD), who was the facilitator in the focus group

discussion (FGD). The facilitator explained to the respondents that PBL in the Faculty of Medicine Undip has been modified since 2005, with the addition of individual and group reports, as well as assessment during discussions and evaluation of individual and group reports. The data collection tools used were a voice recorder and an FGD question guide. The FGD question guide contained several questions, with the aim of exploring students' experiences during PBL and making the FGD process more focused, as follows:

1. What do you think about implementing learning with the problem-based learning method?
2. What benefits do you get from implementing PBL as a learning method?
3. What are the obstacles faced with the PBL method?
4. How do you overcome the obstacles felt in learning with the PBL method?
5. What do you think about the individual and group assignment in PBL?

### Data Analysis

Data analysis in this study employed thematic analysis to identify patterns and extract emerging themes from the qualitative data. The analytical process followed the framework of Miles and Huberman,<sup>17</sup> which emphasized iterative, systematic, and rigorous procedures for qualitative data reduction, display, and conclusion drawing.

The first stage involved collecting data derived from field notes and recordings during focus group discussions (FGDs). All recorded materials were then transcribed verbatim, converting spoken data into written form to ensure the accuracy and completeness of the data corpus.<sup>17</sup>

Subsequently, the transcripts were coded by categorizing data segments with similar characteristics to facilitate interpretation. Coding was conducted independently by KLD and TNK, followed by a joint discussion with LPF and DPD to achieve consensus on the codes and emerging themes. This step aligned with Miles and Huberman's principle of ensuring inter-coder reliability through collaborative validation.<sup>17</sup>

After the initial coding, tentative themes were identified and further refined through iterative analysis to ensure their relevance to the research questions. Each theme was subsequently broken down into sub-themes to capture more nuanced meanings within the data.<sup>17</sup>

Finally, the analysis results were presented narratively, supported by direct quotations from participants to illustrate the sub-themes and strengthen the interpretation of findings. This approach ensure that the voices of participants are accurately represented and that interpretations remain grounded in the empirical data.<sup>17</sup>

**Data Validity**

The data validity in this study is presented in Table 1.

Credibility	Data were checked for completeness to ensure that the information obtained reflected what the respondents intended.
Transferability	Transferability was achieved by displaying sub-themes accompanied by quotes submitted by respondents.
Dependability	Dependability in this study was carried out by explaining the research method in detail.
Confirmability	This method involved examining the data to ensure that the things reported were true so that they could be traced or followed.

**Research Ethics**

The research was conducted after obtaining ethical clearance from the Health Research Ethics Commission (KEPK) FK UNDIP, Semarang No: 140/EC/KEPK/FK-UNDIP/IV/2024.

**RESULTS AND DISCUSSION**

We categorized the FGD results into three topics to explore students' perceptions of the implementation of the modified PBL tutorial. The first topic is the benefits of learning with the PBL method, the second topic is about PBL obstacles, and the third topic is students' suggestions to overcome PBL obstacles.

Table 2 presents the findings from the FGD regarding the benefits of learning with the PBL method, which yielded five themes: benefits of PBL case scenarios, group discussions, independent learning, interactive learning, and creating individual and group reports.

The benefits of PBL, as conveyed by respondents, align with previous studies and are largely consistent with the objectives of the PBL method. The respondents' opinion that case scenarios train the ability to solve problems in a structured manner aligns with the findings of previous studies, which indicate that cases provide a clear picture of fundamental issues and enhance critical thinking and problem-solving skills.<sup>2</sup> As reported in earlier studies,<sup>2,6</sup> respondents also reported that PBL increases communication skills and self-confidence.

Respondents felt that they could understand the material better through group discussions because the speaking style of peers was easier to understand, and learning felt more enjoyable. Another research stated that group discussion could significantly increase students' learning motivation.<sup>10</sup> PBL can also hone the ability to solve problems and foster cooperation, as students find it easier to understand and analyze problems through discussion of the given cases.<sup>5,19</sup> Respondents also felt the benefits of PBL when they became moderators, as they could develop leadership skills, which aligns with previous studies.<sup>20</sup>

Our modification of PBL, which involves giving individual report assignments, is considered beneficial because writing enhances students' understanding. Handwriting encourages students to think more critically about what they write, which helps them process information more effectively and strengthens their long-term memory.<sup>21</sup> Group report assignments are also considered valuable as practical and comprehensive teaching materials, improving understanding of the studied material. However, this approach also has consequences, as students are encouraged to study primarily by completing assignments which contribute to their block score. This does not reflect true self-directed learning, because the motivation to study does not come from internal factors; instead, it arises from the expectation of achieving a good score.

Tabel 2. Benefits of PBL

No	Themes	Sub-themes	Quotation
1	Benefit of case scenarios	The sharpness of thinking patterns	The scenarios can train students to think critically and systematically. "Building a systematic mindset is important because we create a very reflective mindset when becoming a doctor." (AF 21A-P)
		Problem solving	PBL scenarios train students to solve problems in a structured way. "If there is a problem, we can solve it not in a haphazard way, but in a structured way." (RE 21B-L)
2	Benefit of group discussion	More confident in communicating	PBL discussions train students to communicate, express their opinions, and increase their self-confidence. "We can be more confident when expressing opinions in front of friends and more enthusiastic about speaking." (HI 23A-L)
		Broadening horizons	Students gain broader insights through PBL discussions. "We can gain new knowledge from our friends because we complement each other; for terminology, friends add more in-depth so that we understand better." (YO 21B-P)
		Improve understanding of the material.	Students' delivery of their opinion about the material discussed in PBL makes it easier for other students to understand. "Yes, so I understand better because when my friends explain it, the language they used is easier to understand." (CI 22A-P)
		Training Cooperative Skill	PBL examines problems from various perspectives, making it useful both academically and non-academically. "PBL can train cooperative skill. When faced with a problem, we can discuss and solve it together." (OR 21B-L)
		Training leadership	Being a moderator in PBL trains students' leadership in managing the course of a discussion. "When we become moderators, sometimes we have to appoint those who don't have many opinions; we have to follow the course of the discussion, so we have to understand (the discussion) to conclude and be able to lead." (NA 22A-P)
		Ability to compile reports and concept maps	Students practice using mind-map to create concept maps. "Learn to create mind-map using web applications, as concept maps." (GR 21A-P)
3	Benefit of independent learning	Learning is more focused	Step 6 PBL makes students more focused on learning because learning goals are determined together. "For example, about HIV-AIDS, we don't know how much we can learn; with the learning goals there are limits." (EV 21A-P)
		The knowledge gained is broader	Students feel they can broaden their knowledge from various sources. "We need to look for journals or others; it makes us understand better." (DA 22B-L)
4	Interactive learning method	Students are more active in learning.	The PBL method makes students more active in searching for materials to improve their understanding. "PBL provides an opportunity to ask questions, and it is more enjoyable if it is with friends." (RE 21A-L)
5	Benefits of creating individual and group reports	Individual reports broaden and improve understanding of the material	The independent learning stage directs students to search for wider sources and write them in individual reports to improve understanding. "I think the material stays with us more because we look for it and write it ourselves." (TI 22A-P)
		Group reports can be studied again as material for evaluating understanding.	"We can use it to evaluate self-understanding, so you know what you don't understand." (NA 22B-L) "It's a learning material that is very useful to study because it is already complete, so I do not need to read many books when studying similar problem again." (DA 22B-L)

Therefore, such assignments may not necessarily be continued at the final year of the preclinical phase, as the cases are more closely aligned with clinical application, which may, in turn, increase students' intrinsic motivation to study.

Table 3 below presents respondents' perceptions of barriers to PBL.

Respondents complained about the slow distribution of scenarios, which resulted in inadequate preparation. This finding certainly needs to be followed up on by the institution. Lack of material preparation can make student discussions less than optimal.<sup>19</sup>

The regulation prohibiting the use of gadgets during PBL discussions is perceived to reduce student participation to less than optimal levels because students struggle to find answers to case problems. The respondents' opinions suggested that they did not yet fully understand the concept of prior knowledge during the brainstorming stage of PBL discussions. This study also detected the occurrence of task division among students to find materials for each learning objective. This situation indicates that the implementation of step 6 of PBL is not being carried out properly. Step 6 of PBL is intended for each student to study independently to achieve all learning objectives agreed upon in Step 5. Still, students divide the learning objectives to reduce their learning burden. Although this incident may not occur in all discussion groups, it is necessary to evaluate the implementation of the PBL tutorial and the role of tutors to ensure that each student learns all learning objectives.

Respondents realized that the lack of smooth discussion could be caused by students who ignored it, had difficulty expressing their opinions, and lacked preparation for the material being discussed. Other studies also noted that a lack of interest in learning and expressing opinions led to students being inactive in discussions, making tutorial discussions ineffective.<sup>19</sup> Respondents also argued that overly dominant members could make the discussion unbalanced, thereby damaging the group's reputation in front of the tutor and potentially affecting the assessment. Dominant students would

limit the participation of other students, making them feel embarrassed and uncomfortable during the discussion.<sup>22</sup> Tutors play an essential role in this situation, namely by identifying students who are too dominant in the group and reminding them so that the discussion can occur in a balanced manner again.<sup>22</sup> While in our institution, we already put this circumstance in the checklist of the assessment during discussion.

Assignments that require individual reports are considered inhibiting when approaching the summative exam. Other studies also revealed that heavy academic burdens can reduce motivation in learning with PBL tutorials.<sup>23</sup>

Table 4 showed some suggestions from students to overcome various obstacles in implementing PBL.

Respondents expressed hope that the individual assessment system would be replaced with a group assessment. Individual assessment aims to assess aspects of students' communication skills and professional attitudes (discipline, critical thinking skills, and self-awareness). This assessment is easier to do in a small group learning setting because tutors can observe each student's interpersonal interactions, communication skills, and clinical reasoning more closely.<sup>24</sup> Therefore, this type of assessment is needed to assess behavior at the preclinical education stage; if it were changed to a group assessment, the original goal would not be achieved.

Respondents suggested that the issue of less active students could be addressed by their willingness to learn, which in turn would help them grow in confidence when expressing their opinions. Research shows that a lack of preparation before the discussion results in less of students' contributions.<sup>19</sup>

Students also provided suggestions regarding preparing individual reports with in a very short time frame., Effective time management is essential to ensure the timely completion of assignments and other academic responsibilities. Students generally have different time management and priorities when studying and completing assignments, so effective time management greatly influences their ability to study with the PBL tutorial.<sup>8</sup>

Tabel 3. Barriers to PBL

No	Themes	Sub-themes	Quotation
1	Barriers of scenario distribution	Delayed distribution of the scenarios	The scenario distribution was too close to the discussion schedule, so preparation was lacking. "The scenario distribution was too close, so the discussion was half-hearted, not very lively." (LU 21A-L)
2	Barriers to PBL rules and individual assessments during discussion	Ban on using gadgets  Individual Assessment during the discussion	The rule not to use gadgets during discussions makes student participation less optimal. "Yes, I've been preparing less and less. When something suddenly comes up during the discussion and we're not allowed to browse, I don't know what to say." (LU 21A-L)  According to students, assessment during discussions feels inhibiting "Students who talk a lot felt pressured to reduce it, while those who do not master the material are confused about what to talk about." (RE 21A-L)
3	Variation of student participation in discussions	Lack of focus of students during discussions  Difficulty in expressing opinions  Passive students during discussions  Members do not prepare materials  Dependence on active students  Students who are too dominant  Pressure from group members	Some students do not pay attention to the discussion. "When his friend is explaining, he is busy reading his own." (AF 21A-P)  Students find it difficult to express their opinions due to their lack of materials. "During the stage 2 discussion, students prepare materials based on the assigned learning objectives; when they have explained them completely, other students find it difficult to add anything further." (IN 21B-P)  Passive students become an obstacle because other members are confused about adding opinions. "I was once in a group with a passive member, the material to be delivered had been assigned but he did not speak, we were confused as a group." (TI 22A-P)  Some students do not prepare materials, so other members gain less new knowledge from the discussion. "We also want to add information from other friends, but in the end, we get nothing." (NA 22A-P)  Sometimes, some members do not participate because they are too dependent on students who are considered more capable. "Oh, there are smart ones, so I can relax a bit." (SA 23A-P)  Students who are too dominant are considered obstacles because member participation becomes unbalanced. "We become less active because he has delivered all the material." (RI 23B-P)  Some students feel pressure from their group members if they want to add opinions. "I feel like my friends accuse me of causing the discussion to take a long time." (AF 21A-P)
4	Task of individual reports	Individual reports are sometimes a burden.	Individual reports were a burden, especially when there were exams, so students felt that they had less time to study for exams. "Sometimes we have exams, so PBL tutorial is like something that should be concise, but because we have to write for one to two hours, the time to study for exams is cut short." (FI 22A-L)
5	Lack of cooperation in making group reports	The variations of members' contributions of in the final report.	Some students did not want to participate in the group report, causing difficulties for other members. "Sometimes there are some people who forget to fill in the material from the learning objectives, so the notetaker takes from the material he has." (JO 23A-L)

**Tabel 4. Suggestions from Students**

No	Themes	Notes
1	Sharing scenarios earlier	Students can study cases before the first discussion to be more active during the discussion. "We can explore and understand the problem better, and get more information." (LU 21A-L)
2	Change PBL regulations	Allowed to open gadgets at the end of the first discussion. "Maybe at the end of the discussion it can be allowed, so that we all know." (RE 21A-L) Students hope that individual assessments during discussions change to group assessments. "More to groups, not individuals, so that the assessment is more objective, according to PBL criteria." (JO 23A-L) Students hope that all facilitators refer to one set concept map rule. "There should be regulations to standardize the way to make concept map." (CI 22A-P)
3	Students should be willing to learn	Student participation in discussions can be increased if students are willing to learn so that they have confidence in expressing opinions. "To be able to convey, you have to learn before the discussion, and for passive friends, we help them by giving the material to convey while other friends will try not to discuss the same material." (SA 23A-P) "Maybe you have to learn first before PBL, either discussion one or two." (FT 23B-L)
4	Individual report assignments are adjusted	Students hope that the assignment of individual reports can be changed from handwriting to typed ones. "If it is typed, the drawback is that it can be just copied and pasted and not read, of course, it goes back to each individual. If it is typed and read, it seems that learning will be more effective and not a waste of time writing it." (AF 21A-P)

This study is a qualitative investigation that explores and describes the experiences of students participating in modified PBL, providing material for a more comprehensive evaluation of the program. However, the results of this study only reflect the opinions of respondents from an institution where several students tend to be passive during PBL. Moreover, the characteristics of participants in this study only varied based on gender and GPA, but we did not involve the students based on their activity in the PBL tutorial.

**CONCLUSION**

The results of this study indicate that students feel various benefits from the implementation of the modified PBL tutorial that the institution has carried out. However, it can also potentially threaten the internal motivation of a self-directed learner.

**SUGGESTIONS**

Further research is needed to explore the perceptions of tutors and the curriculum development team regarding the implementation of the fourth step (creating a concept map), which students complained

about in this study. While in the PBL, the scenario should be created based on the current health issues to raise students' internal motivation and interest in studying the problems. Additionally, for final-year pre-clinical phase students, we can consider discontinuing the PBL assignments and evaluating their motivation for self-directed learning.

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**DECLARATION OF INTERESTS**

The authors declare that there is no conflict of interest related to this manuscript's study.

**AUTHORS' CONTRIBUTION**

**Kintania Lutfiah Dinar** – developing the research proposal, data collection, data analysis, and publication manuscript.

**Tri Nur Kristina** – data analysis, finalization of publication manuscript.

**Lathifa Putry Fauzia** – developing research proposal and publication manuscript.

**Dian Puspita Dewi** – publication manuscript.

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