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Best practices in health professions education: keeping the essence of problem-based learning

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INTRODUCTION

Health professions education (HPE) has evolved and undergone major transformation over the years. In the past decade or more, it has become inevitable that we prepare our students to be lifelong learners and inculcate practices that allow them to work with other professionals in patient-centered healthcare environments (Naidu and Ramani, 2024). In this complex educational environment, it is important to adopt new strategies that emphasise a student-centred approach rather than a teacher-centred one. Traditional teaching methods such as didactic lectures are important, but literature shows that the students turn into passive learners, who adopt rote learning (Challa, Sayed and Acharya, 2021).

Many student-centred learning approaches have been introduced over the past decades. Problem-based learning (PBL) is one of the important student-centred learning approaches that was introduced in the late 1960s at McMaster University, Canada (Schmidt, 2012). PBL is a learner-centred, pedagogical approach using problem as a learning trigger that helps to improve problem-solving skills and gain new knowledge (Wood, 2003). Evidence indicates that PBL inculcates deep learning as compared to rote learning via non-PBL approaches (Abraham et al., 2008). The students in small groups deal with complex problems depending on the level of the learner (Hmelo-Silver, 2004). During PBL, solving the problem per se is not the primary objective, but its importance lies in the process of learning through the problem. Through this process the students acquire new knowledge on how to approach a problem and other skills, such as self-directed learning, collaboration, and self-motivation (Hmelo-Silver, 2004). PBL enhances student engagement, which is vital for HPE. (Kassab, Taylor and Hamdy, 2023). The main principles of PBL however remain unchanged where learning occurs through investigation of the problem, collaboration and being facilitated. Because it takes more human resources and ongoing training to implement, its use is not uniformly widespread (Trullàs et al, 2022).

IMPLEMENTATION

DESIGNING PBL SCENARIOS (Wood, 2003)

1. It is crucial that the PBL scenarios are aligned with the student learning objectives. This will ensure appropriate course alignment and will assist students to learn the appropriate topic.
2. It is essential for the faculty to know the level of learner. This will ensure the student has some prior knowledge about the scenario.
3. The scenario should be innate, and relevant to future practice.

4. The PBL problem should have appropriate mix of horizontal and vertical integration based on the level of the learner
5. The cues and trigger in the scenario should provide sufficient information to provoke discussion and promote participation and to seek resources
6. To ensure that points 1 to 5 are achieved it is important that the PBL scenario undergoes a comprehensive vetting process

POINTS TO ENSURE FOR CONDUCTING A PBL SESSION (Wood, 2003)

1. Problem stated should be relevant and clear.
2. Small group composition should ideally comprise 8–10 students.
3. The problem should inculcate critical and analytical thinking
4. Appropriate learning resources should be included.
5. Adequate PBL rooms are available to conduct the sessions.
6. Appropriate assessment (formative and summative) methods are used (example: rubrics to record process and content).
7. All tutors should be trained for facilitating the PBL.

PBL MODELS AND APPROACHES

There is no ideal model to conduct the PBL session. The viewpoints are variable in this regard to the type of model to be used. It is vital that those framing the PBL scenarios and conducting the PBL keep the learner's knowledge, the types of problems, and the learning activities which are appropriate to attain these goals (Wijnia, Loyens and Rikers, 2019). The PBL can be distinguished as "PBL as a simulation of professional practice", "PBL as a mental model construction", "PBL models on learning how to learn".

BARROWS' PBL TAXONOMY

The Taxonomy by Barrows' mentions that there is no one single method to conduct a PBL but includes various approaches that vary in design, goals, and efficiency. The major objectives that the PBL can focus are four main objectives:

1. Structure Knowledge for Clinical Context (SCC), where the PBL should incorporate learning should include clinical reasoning.

2. To develop clinical reasoning processes (CRP) i.e., reasoning skills such as generating hypothesis, analysis of data and making decisions.

3. Enhance Self-Directed Learning (SDL), to become lifelong learners.

4. To increase motivation (MOT), which should include real problems to motivate students.

Barrows' separates the PBL taxonomy as Lecture-based cases, Case-based lectures, Case Method, Modified Case-Based methods. Example: sequential management problem (SMP) – the problems consist of facts which are provided in the case and the student decides through limited enquiries or decisions. Another example could be through patient management problem (PMP), where the actions and decisions are made by the student through alternatives given in the problem, Problem-Based, Closed-loop (Reiterative) PBL (Barrows, 1986).

The closed-loop PBL consists of five main steps. 1. Analysis of the problem, 2. Independent analysis by the student (SDL), 3. Evaluate the problem through references, 4. Revisit the problem to understand it effectively, 5. Go through the steps 1 and 2, if required to for deeper understanding and fill knowledge gaps (Barrows, 1986).

Students begin with a problem presented in a simulation format, allowing free inquiry. They use clinical reasoning to generate hypotheses and identify learning needs. The PBL taxonomy by Barrows's compared against the four main objectives, which showed that the closed-loop PBL was effective in addressing all four objectives which PBLs should attain (Wijnia, Loyens and Rikers, 2019).

SEVEN-JUMP APPROACH

The seven-jump approach has been used widely for conducting PBLs in health sciences (Wood, 2003). The steps of the seven-jump approach are represented in figure 1.

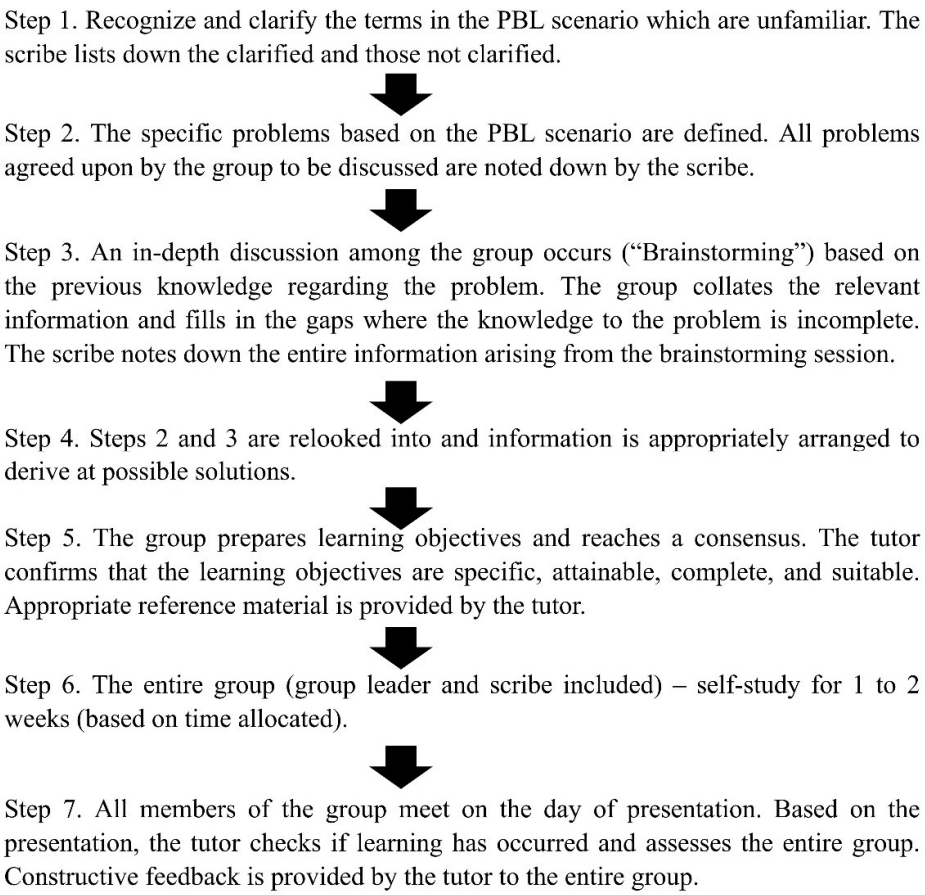

Figure 1: Steps of the seven-jump approach

HYBRID PBL (H-PBL)

Hybrid PBLs are conducted by either combining traditional teaching-learning methods with PBL sessions or PBL with inclusion of faculty who conduct mini-lectures and provide feedback to the students. The students are engaged through faculty guided discussions and students present their findings (Wijnia, Loyens and Rikers, 2019).

Studies conducted through hybrid PBLs indicate deeper understanding of the subject and clinical reasoning by the students (Jiménez-Saiz and Rosace, 2019). Students are motivated to learn and a safe-learning environment. However, the drawbacks of the hybrid PBL are that it is resource-intensive, time consuming for faculty and students and variability in types of PBL being conducted. (Ishizuka, et al 2023)

PROJECT-BASED LEARNING (PROJECT BL)

Project BL classified under "Learning by Doing" (Aalborg Model, Denmark), is conducted where the problems are considered as projects. Student teams (each team consisting of a small group) work on a problem to obtain a tangible product, which is evaluated by the faculty. The three main processes are 1. Analysis of the problem, 2. Solving the problem, 3. Project report which includes documentation and draws conclusions to the problem. The project-BL enhances deeper learning of real-life situations and enhances teamwork. The drawbacks are that it is time-consuming and complex in the assessment of the projects (Wijnia, Loyens and Rikers, 2019).

ROLE OF PRIMARY STAKEHOLDERS FOR A PBL

The internal stakeholders for a PBL consist of the tutor (facilitator), group leader, group members, and scribe. Before the start onsite, it is important to clarify the roles played by each internal stakeholder. The tutor may have to be a floating facilitator depending on the number of groups and the availability of tutors (Wood, 2003).

BEST PRACTICES

The role of tutor (Figure 2) and role of group leader, members and scribe are mentioned in figure 3.

Role of tutor: Dos	Role of tutor: Don'ts
● Foster critical thinking ● Emphasizes ground rules ● Encourage brainstorming ● Encourage collaboration ● Foster communication skill ● Should assess group dynamics ● Able to self-assess tutoring skill ● Assess performance of the students ● Check understanding of the students ● Need to give up the role of an expert ● Ensures all members actively participate ● Generates a non-threatening atmosphere ● Should invite students to assess tutor skill ● Checks that the scribe keeps an accurate record ● Facilitate by asking probing questions (open & closed ended) ● Ensure group achieves appropriate learning objective ● Need to intervene at appropriate times but without expert opinions ● Provide students with constructive feedback	● Lecturing ● Dominate in group discussion ● Act as content expert ● Be authoritarian ● Indulge in criticism ● Suggest radical changes before delivery ● Lack interest and engagement ● Take ownership of the project and try to control the student learning process ● Avoid focusing to your own area of expertise

Figure 2: Role of Tutor – Dos and Don'ts for PBL

Role of group leader	Role of group member	Role of scribe
● Asks questions ● Active listening ● Active participation ● Answers questions ● Acts as a timekeeper ● Focuses on group goals ● Shares relevant information ● Guides documentation (by scribe) ● Encourages and ensures participation of all group members	● Asks questions ● Active listening ● Answers questions ● Active participation ● Focuses on group goals ● Participates in discussion ● Shares appropriate information	● Asks questions ● Active listening ● Active participation ● Records discussion ● Participates in discussion ● Summarizes relevant information ● Ensures that documentation of information accurately reflects contributor's intent

Figure 3: Role of group leader, group members and scribe

CHALLENGES

STUDENT RELATED

The primary source of PBL's behavioural issues with students is that most of them have traditional educational backgrounds, whether from high school or their first degree. While participating in the PBL, they experience nervousness and worry about "not knowing when to stop" when their learning needs are examined. This problem must be resolved by tutors providing a clear briefing procedure and establishing a non-threatening atmosphere. To benefit from this kind of approach, students stress and acknowledge the necessity of developing specific soft skills or competencies, such as good communication techniques, time management, and leadership, which help prevent resistance to change (Vasquez and Lara, 2020). Student learning behaviours that can help them attain learning outcomes are enforced by intrinsic empowerment. Students can become lifelong learners by encouraging the development of these behaviours.

TUTOR RELATED: IMPLICATIONS FOR EDUCATORS

The didactic tutoring method frequently goes beyond the level of facilitation. Therefore, it is crucial to have regular faculty development programs to improve PBL tutoring skills (Zubair and Khoo, 2003).

CONTEXT RELATED

PBL produces its exceptional outcomes only when the context supports more in-depth conversation. As a result, the PBL room should be set up to facilitate easy eye contact and one-on-one interaction. Also, it would be effective to divide the groups into smaller ones when the number of participants exceeds ten or more. The tutor could then serve as a floating facilitator.

ASSESSMENT

Traditional exams often privilege factual recall, underrepresenting competencies central to PBL such as diagnostic reasoning, collaboration, and self-direction (Marks-Maran and Thomas, 2000). Moreover, tutorial performance is typically judged with heterogeneous criteria (use of rubrics is required) Where assessment emphasizes discrete facts, students may disengage from inquiry and revert to surface learning, eroding PBL's benefits (Georgiades et al., 2015).

CURRICULUM OVERLOAD

The time required for inquiry is vital as compared to coverage obligations. Overload also occurs when the problems are broad or have poor scope. This can create learning issues and can be a cognitive burden for students (Kirschner, Sweller, and Clark, 2006).

RESOURCE DEMANDS

An effective PBL requires trained faculty, well-developed PBL problems, small groups (with 6 to 8 students ideally), appropriate numbers of PBL rooms and suitable assessment load.

FACULTY RESISTANCE

Resistance often stems from beliefs about effectiveness compared to lectures, identity concerns (from "content expert" to Tutor / facilitator) and workload fears (Georgiades et al., 2015). Faculty training programmes should be provided which included problem design, facilitation skills, and rubric development (Olewnik, Horn, and Schrewe, 2023).

CONCLUSION

PBL is an innovative method that shifts the learner from a passive to an active, learner-driven approach. The impact of PBL extends beyond basic knowledge acquisition, curriculum design, evaluation techniques, and the role of teachers. PBL helps to develops higher order thinking abilities, clinical reasoning, and SDL competencies, which are essential for health professions education, by integrating compelling, challenging problems into the learning process. PBL when conducted carefully and purposefully, helps students develop the critical thinking, flexibility, and teamwork skills that are essential for modern professional practice. Systematic design, skilled facilitation, and coherence between desired learning outcomes and assessment techniques are essential to PBL's effectiveness. Programs for faculty development, such as those that teach facilitation and assessment skills during PBL, give teachers the tools they need to apply PBL successfully, which improves student comprehension and skill development. Conducting the PBL appropriately would greatly benefit the learners. Keeping the essence of PBL is vital. The seven-jump approach is the most effective method since it retains every aspect of PBL.

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