
ORIGINAL ARTICLE**Faculty perceptions and practices of problem-based learning in India: Strengths, weaknesses, opportunities, and challenges**

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Abstract

Background: Problem-Based Learning (PBL) is a learner-centered instructional method that is increasingly being implemented in India. Despite its educational potential, its efficacy may be impacted by differences in teacher perception and implementation techniques. **Aim and Objectives:** To assess faculty perceptions, practices, and the Strengths, Weaknesses, Opportunities, and Challenges (SWOC) of PBL implementation. **Material and Methods:** A cross-sectional study was conducted among faculty from various medical colleges in India. A validated questionnaire was distributed via Google Form and included demographic details, perception items, and open-ended SWOC questions. Descriptive and inferential statistics were performed for 162 responses, and manual content analysis was done for SWOC questions. **Results:** Among 162 participants, 98 (60.5%) faculty claimed to have conducted PBL, and they had more accurate perceptions about PBL being useful for active learning, clinical reasoning, integration, and communication skills. However, they also held misconceptions that PBL was not appropriate for Phase 1 or 2 students (49%), and conflated PBL with case-based learning (58.2%). SWOC analysis of PBL revealed the development of 21st century skills and student engagement as strengths, and lack of trained facilitators and resource constraints, as weaknesses. Opportunities were identified in integration with CBME, early clinical exposure, and interdisciplinary teaching. Challenges included faculty resistance and logistical limitations. **Conclusion:** Faculty who had conducted PBL sessions had a better understanding compared to faculty without prior experience in it. Despite having strengths and opportunities, PBL has its own challenges and addressing them is essential for effective implementation of PBL.

Keywords: Problem-based learning, Teaching learning method, Competency-based medical education, Faculty perception, SWOC analysis

Introduction

Problem-Based Learning (PBL) is a student-centered pedagogical approach that uses clinical vignettes as the starting point for generating learning objectives [1]. In the modern Competency-Based Medical Education (CBME) curriculum, there is a strong demand to develop critical thinking, problem-solving, and analytical skills, which traditional didactic lectures fail to adequately

cultivate. PBL directly aligns with CBME goals by enabling students to correlate theory with clinical practice [2]. It stimulates deep cognitive processing while fostering crucial conative and affective benefits, such as intrinsic motivation, cooperative teamwork, and lifelong self-directed learning [3]. Barrows conceptualized PBL as a "genus" of many "species," ranging from information-oriented

teaching to high-fidelity problem-solving, a diversity that today encompasses strategies like Case-Based Learning (CBL) and often creates practice ambiguity among faculty [4]. While both are small-group methods, PBL is an unstructured "open inquiry" with no prior preparation, where facilitators leave errors uncorrected to foster self-directed learning and scientific curiosity [3]. In contrast, CBL is a structured "guided inquiry" requiring advance preparation, where active facilitators steer discussions toward predefined outcomes and directly correct student misconceptions. Although PBL's open design is educationally superior for nurturing independent resource utilization, both faculty and students overwhelmingly prefer CBL for its structured, time-efficient focus [3,5].

Transitioning to student-centered models like PBL is highly challenging because they are extremely faculty- and resource-intensive, requiring specialized physical spaces and a substantial teaching workforce [1,3]. Faculty must undergo a significant shift, adapting to a passive facilitator role that can be challenging to manage alongside unstructured student-led discussions [3]. Consequently, there is an urgent need to study these challenges from the educators' perspective.

The study was aimed to explore faculty perceptions regarding the implementation of PBL; to assess the current practices of PBL among medical college faculty and to identify the Strengths, Weaknesses, Opportunities, and Challenges (SWOC) associated with PBL implementation among faculty who have conducted PBL sessions.

Material and Methods

Study design and setting

A cross-sectional observational study was conducted from January 2025 to June 2025 to explore faculty perceptions regarding the implementation of PBL in undergraduate medical education among

faculty members working in various government and private medical colleges across India.

Study participants and sampling

Faculty members from pre-clinical and clinical departments currently employed at medical colleges were eligible to participate. The minimum required sample size was calculated as 100, assuming a 50% prevalence of positive perception of PBL, using the formula $4PQ/L^2$. A total of 162 faculty responses were included in the final analysis. Convenience sampling technique was used for the study. Participants were grouped into two categories based on their experience in conducting PBL sessions.

Questionnaire development and validation

The questionnaire comprised three sections: Section A included demographic details such as designation, department, institution, years of teaching experience, and involvement in the CBME curriculum; Section B assessed faculty perceptions of PBL using a 3-point Likert scale. The items for Likert scale were obtained from the content analysis of broad open ended questions in a prior survey conducted by the Principal Investigator among thirty faculty members currently pursuing Masters in Health Professional Education course to explore their perceptions, key challenges, perceived benefits and misconceptions associated with PBL; and Section C explored faculty perspectives on the SWOC of PBL through open-ended questions. Three subject experts, each with more than 10 years of teaching experience, validated the draft questionnaire for language clarity, content relevance, and coverage of key constructs. Their suggestions resulted in iterative changes that improved the questionnaire's face and content validity. Pilot testing of the questionnaire was done among ten faculty members from various departments to assess the items'

comprehensiveness, clarity, and structure. These 10 responses were excluded from the final analysis. The language and appropriateness of the items were improved in response to feedback obtained from the pilot study. The internal consistency of the perception scale was assessed using Cronbach's alpha using data from the final study sample ($n = 162$). The scale showed good internal consistency (Cronbach's $\alpha = 0.82$).

Data collection procedure

Prior approval was obtained from the Institutional Research Committee (IRC) and the Institutional Ethics Committee (IEC) (PSPMCHRI/IEC/32/2024). The Google Forms for the survey were sent through various digital platforms like email, WhatsApp, and Telegram for wider accessibility. Participation was voluntary, and informed digital consent was obtained before they respond to questions. Out of 60 emails sent to faculty members from various departments in various medical colleges, only 38 responded (response rate for email: 63.3%); whereas we were not able to calculate the response rate in WhatsApp and Telegram. Out of A total of 162 faculty members responded for the survey, 98 reported that they had conducted PBL and 64 had not conducted PBL. Questions on SWOC in questionnaire were filled by only 98 faculty members who had previously conducted PBL. Data was exported to Microsoft Excel 2019, and demographic variables along with faculty perceptions were analyzed using the Statistical Package for the Social Sciences software version 24.0 (IBM Co., Armonk, NY, USA), expressed as frequencies and proportions. Content analysis of the broad, open-ended questions related to SWOC was done manually.

Results

This cross-sectional observational study successfully collected data from 162 faculty members across various government and private medical colleges in India to assess their perceptions regarding PBL implementation. The study participants were categorized into two groups based on their experience with PBL: those who had conducted PBL sessions ($n = 98$, 60.5%) and those who had not ($n = 64$, 39.5%).

Demographic characteristics

Among faculty members who had conducted PBL sessions, males comprised 61.2% ($n = 60$) compared to 46.9% ($n = 30$) in the non-conducting group (Table 1). The distribution of academic positions showed that assistant professors were the most represented category in both groups, accounting for 51.0% ($n = 50$) of PBL conductors and 48.4% ($n = 31$) of non-conductors. Professors comprised 20.4% ($n = 20$) of the PBL-conducting group versus 18.8% ($n = 12$) of the non-conducting group, while Senior Residents were more prevalent among non-conductors (7.8%, $n = 5$) compared to PBL conductors (3.1%, $n = 3$). Departmental distribution showed that clinical faculty constituted the largest proportion of PBL conductors (43.9%, $n = 43$), followed by para-clinical (30.6%, $n = 30$) and pre-clinical faculty (25.5%, $n = 25$). In contrast, pre-clinical and clinical faculty were equally represented among non-conductors (34.4% each), with para-clinical faculty comprising 31.3% ($n = 20$) of this group. No significant differences were observed between the groups with respect to gender ($\chi^2 = 3.23$, $p = 0.070$), academic designation ($\chi^2 = 1.88$, $p = 0.598$), and department ($\chi^2 = 1.93$, $p = 0.382$). A

statistically significant finding ($t = 9.54, p < 0.001$) was the difference in teaching experience between the two groups with faculty members who had conducted PBL sessions having substantially more teaching experience (16.8 ± 5.2 years) compared to those who had not conducted PBL sessions (8.6 ± 4.9 years).

Table 2 depicts the frequency of PBL practice components among faculty members. The most widely used component was case-based scenarios, which were used by all respondents ($n = 98$).

Active engagement was encouraged by the widespread use of student-directed learning ($n = 66$) and group discussions ($n = 82$). Only 47 faculty members engaged students in presenting their findings, whereas role assignment ($n = 63$) promoted structured collaboration. Fewer faculty used charts/multiple choice questions (MCQs) for closure ($n = 38$) and included multiple sessions with feedback ($n = 34$), suggesting that most of the faculty conducted PBL in a single session, like a case discussion session.

Table 1: Comparison of demographic variables based on PBL implementation experience (N = 162)

Variables	Sub-Variable	Conducted a PBL Session (n = 98)	Not conducted a PBL Session (n = 64)	Chi-square test / t test; p
Gender	Male	60 (61.2%)	30 (46.9%)	3.2286;
	Female	38 (38.8%)	34 (53.1%)	0.07
Designation	Professor	20 (20.4%)	12 (18.8%)	1.8794;
	Associate Professor	25 (25.5%)	16 (25.0%)	0.5978
	Assistant Professor	50 (51.0%)	31 (48.4%)	
	Senior Resident	3 (3.1%)	5 (7.8%)	
Department	Pre-Clinical	25 (25.5%)	22 (34.4%)	1.9251;
	Para-Clinical	30 (30.6%)	20 (31.3%)	0.3819
	Clinical	43 (43.9%)	22 (34.4%)	
Years of teaching experience	Mean $\pm$ SD	16.8 $\pm$ 5.2 years	8.6 $\pm$ 4.9 years	9.5428; <0.001*

* $p < 0.05$ – Significant

PBL – Problem based learning; SD – Standard Deviation

Table 2: Faculty-practiced components of problem-based learning in PBL sessions (n = 98)

PBL Practice	N (%)
Case-based scenario	98 (100)
Group discussion	82(83.7)
Role assignment	63(64.3)
Student-directed learning	66(67.3)
Presentation of findings by the student	47(48)
Multiple sessions with feedback	34(34.7)
Use of charts/MCQs for closure	38(38.8)

PBL – Problem based learning; MCQs – Multiple choice questions

Table 3: Faculty's perceptions of PBL implementation among faculty who have (n = 98) and have not (n = 64) conducted PBL sessions

Correct perceptions about PBL					
Perception Statement	Explanation	Faculty conducted PBL session	Agree n (%)	Neutral n (%)	Disagree n (%)
Enhance communication, teamwork, and leadership	Small group discussion and shared responsibilities develop these soft skills.	Yes (n = 98)	80 (81.6)	18 (18.3)	0
		No (n = 64)	28 (43.8)	34 (53.1)	2 (3.1)
Promotes deep, integrative, and long-term learning	Students link theory to real-world scenarios, critical thinking and improving retention.	Yes (n = 98)	75 (76.5)	8 (8.2)	15 (15.3)
		No (n = 64)	13 (20.3)	41 (64.1)	10 (15.6)
Encourages student-centered, active learning	Students take the lead in exploring and solving problems.	Yes (n = 98)	92 (93.9)	5 (5.1)	1 (1)
		No (n = 64)	49 (76.6)	4(6.3)	11(17.1)
PBL allows for clinical reasoning and problem-solving	These are explicit aims in health sciences education using PBL.	Yes (n = 98)	94 (95.9)	4 (4.1)	0
		No (n = 64)	58 (90.6)	6 (9.4)	0

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Effective for horizontal and vertical integration of subjects	PBL bridges concepts across disciplines (e.g., pathology + pharmacology + clinical medicine).	Yes (n = 98)	87 (88.8)	11 (11.2)	0
		No (n = 64)	19 (29.7)	22 (34.4)	23 (35.9)
PBL helps with the real-world application of theoretical knowledge	Using cases or clinical scenarios helps students contextualize their learning.	Yes (n = 98)	92 (93.9)	6 (6.1)	0
		No (n = 64)	57 (89.1)	6 (9.4)	1 (1.5)
Incorrect perceptions about PBL					
“PBL is not suitable for Phase 1 or 2 students”	PBL can be adapted for pre-clinical students using age/stage-appropriate problems and facilitator support.	Yes (n = 98)	36 (36.7)	14 (14.3)	48 (49)
		No (n = 64)	54 (84.4)	3 (4.7)	7 (10.9)
“PBL cannot be used for large groups”	While traditional PBL is small-group based, hybrid models (e.g., Team-Based Learning, Modified PBL) can be adapted for large groups	Yes (n = 98)	44 (44.9)	12 (12.2)	42 (42.9)
		No (n = 64)	49 (76.6)	4 (6.3)	11 (17.2)
“PBL leads to misinformation if students lead discussions”	With a trained facilitator, this is minimized. The facilitator's role is to guide and correct, not to dominate.	Yes (n = 98)	62 (63.3)	8 (8.2)	28 (28.6)
		No (n = 64)	53 (82.8)	2 (3.1)	9 (14.1)
“PBL is just case-based discussion”	CBL and PBL are different; PBL involves problem exploration before structured knowledge is acquired, while CBL is often instructor-led and knowledge-focused.	Yes (n = 98)	31 (31.6)	10 (10.2)	57 (58.2)
		No (n = 64)	34 (53.1)	0	30 (46.9)

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“PBL only works with intelligent or vocal students”	With effective group dynamics and role distribution, every student can engage and benefit.	Yes (n = 98)	38 (38.8)	8 (8.2)	52 (53.1)
		No (n = 64)	33 (51.6)	6 (9.4)	25 (39.1)
“PBL requires no facilitator involvement”	In truth, a trained facilitator is crucial for managing group dynamics, guiding learning, and ensuring educational outcomes.	Yes (n = 98)	22 (22.4)	0	76 (77.6)
		No (n = 64)	14 (21.9)	0	50 (78.1)

PBL – Problem based learning; CBL – Case based learning

Table 4: SWOC thematic analysis for PBL (n = 98)

Strengths for PBL		
Categories	Codes	Illustrative Quote
Development of 21st-century skills	Critical thinking, clinical reasoning, problem-solving skills, communication skills, leadership skills, collaboration and teamwork skills, SDL, adaptability and flexibility to deal with the problem	“PBL encourages students to think beyond rote learning, pushing them to explore, discuss, and reflect.” “Students who were otherwise passive became more vocal and took leadership roles.” “They learn from each other, which strengthens knowledge.” “PBL fosters essential 21st-century skills needed for evolving roles in medicine.”
Enhanced learning and retention	Active learning and discovery learning, in-depth understanding, increased student interest and motivation, long-term retention of knowledge, a holistic thinking about problem	“Students come prepared, and they surprise us with the depth of their questions.” “Once they go through a PBL case, they remember it far longer than textbook content.” “The method motivates students to take ownership of their learning process.”

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Cognitive and engagement benefits	Stimulates thought processes in students, targets higher levels in the cognitive domain, focuses deep discussion and analysis of problems, expecting solutions, promotes reflection	<i>"The process forces them to analyse problems deeply, not just recall facts."</i> <i>"They begin to reflect on why a solution works or doesn't. That's real learning."</i> <i>"PBL stimulates the thought process better than any lecture I've given."</i>
Weaknesses for PBL		
Theme	Codes	Illustrative Quote
Resource constraints	Resource-intensive, time-consuming, lack of trained faculty	<i>"Phase 1 students struggle... and we need more faculty to do it properly."</i> <i>"We simply don't have enough facilitators to manage this for a class of 250."</i> <i>"It takes a lot of planning and effort from tutors, and that's not always feasible."</i> <i>"We lack trained faculty for preparation, implementation and assessment for PBL."</i>
Inconsistency in implementation	Varied knowledge levels, no standard protocol, poorly designed problems, and a lack of sustainability	<i>"Different students come with different levels of understanding; some just can't cope."</i> <i>"The quality of the case makes or breaks the session, and poorly framed ones don't work."</i> <i>"Without a standard protocol, results vary drastically from group to group."</i>
Assessment difficulties	Difficult to assess the individual performances of the students, no standard assessment format, faculty	<i>"Evaluation in PBL is not as structured as traditional exams, and that affects grading."</i> <i>"Assessing individual effort is hard in a group setting."</i>
Student participation and engagement issues	Cognitive overload, wrong group learning, unequal participation, poor self-motivation, poor group dynamics	<i>"For Students who lack self-directed & self-motivational learning skills, PBL might be meaningless."</i> <i>"The process can be complex and may not always be received actively by students."</i> <i>"If the group goes off-track, they end up memorising the wrong stuff."</i>

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Opportunities for PBL		
Theme	Codes	Illustrative Quote
Integration with modern curricula	Aligns with the CBME framework, NMC recommendation and ECE	<i>"The CBME curriculum encourages learner-driven methods like PBL..."</i> <i>"Modified PBL is recommended to be a part of the curriculum by the NMC."</i> <i>"PBL fits within the early clinical exposure framework."</i> <i>'Opportunities exist to incorporate PBL into the curriculum at the right place and time.'</i>
Application in clinical and real-world settings	Beneficial in bedside clinics and clinical postings, excellent for discussing any number of cases, bridges the theory-practice gap and offers real-life experience, prepares students to deal with medical complexity	<i>"Bedside discussions through PBL help bridge theory and practice."</i> <i>"PBL prepares students for the real-world complexity of patient care."</i> <i>"We've used recorded surgeries to trigger critical thinking in students."</i>
Enhanced learning experience	Fosters deeper conceptual understanding, improves analytical ability, facilitates interaction with students, provides opportunities for live classes, hands-on training, and assignments, and can integrate teaching by multiple departments	<i>"Allow all participants to think on a common platform and arrive at a correct decision."</i> <i>"It helps students integrate knowledge across departments and think beyond textbooks."</i> <i>"PBL sessions provide a common platform for discussion and problem-solving."</i> <i>"It promotes live interaction and hands-on engagement with real cases."</i>
Curriculum development and faculty growth	Useful for curriculum development, improved teaching strategies, and academic reflections	<i>"We use our PBL reflections to improve curriculum and share teaching strategies."</i> <i>"Even as teachers, we grow our teaching strategies..."</i>

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Challenges for PBL		
Theme	Codes	Illustrative Quote
Faculty-related constraints	Lack of training, difficulty in problem designing and implementation, lack of cooperation from other faculty members, challenge in shifting from didactic teaching to facilitation	<i>"Designing a good case is harder than it looks." "Some still prefer lectures and resist PBL." "Training and sensitization of faculty is a big challenge." "Designing appropriate and effective problems or case cards is challenging"</i>
Design and implementation complexity	Non-motivated students, unsuitable for all learners, varied capacity and knowledge level of students, lack of active participation and commitment from the students, difficulty in grasping the concepts	<i>"It's hard to get everyone involved consistently." "Hard to involve everyone in mixed-ability groups." "Students prefer shortcuts for learning and might not be interested in PBL and may disengage."</i>
Student engagement and outcome variability	Lack of resources (limited infrastructure, lack of staff, unsuitable classrooms, time constraints)	<i>"We can't sustain this unless infrastructure improves." "There will be time constraints because of many PBL sessions" "Gallery classrooms are not ideal for small group discussions." "We need more rooms and trained staff to run parallel PBL sessions." "It is difficult to conduct PBL sessions within the allotted hours of each department"</i>
Content and curriculum related issues	Curriculum alignment issues, topic suitability issues	<i>"It may miss some core subjects if not carefully aligned." "If not mapped properly, PBL may miss essential topics." "Too many PBL sessions can overwhelm both faculty and students."</i>

Analysis of faculty perceptions about PBL implementation

The researchers analyzed perceptions of faculty's correct and incorrect perceptions about PBL implementation, as shown in Table 3. Of the 162 faculty who responded, 98 had experience

running PBL sessions and shared their opinions of the effectiveness of PBL, with the majority (81.6% of experienced against 43.8% of inexperienced) agreeing that PBL enhanced communication, teamwork, and leadership skills, with

93.9% and 76.6% agreeing that PBL fostered student-centered active learning and supports clinical reasoning and problem solving, 95.9% and 90.6% agreeing that it supports horizontal and vertical integration, and 93.9% and 89.1% agreeing that PBL applies theoretical knowledge to real-world scenarios. However, there were still misconceptions, with nearly half of the experienced faculty (49%) still believing PBL was not appropriate for Phase 1 or 2 students, 42.9% feeling it was impractical for large groups, 28.6% fearing that student-led discussions could lead to misinformation, 58.2% equating PBL with simply case-based learning, 53.1% believing that it only helped the most intelligent or vocal students, and 77.6% strongly rejecting the notion that PBL could work without the involvement of a facilitator.

SWOC analysis of faculty perspectives on implementing PBL

A SWOC analysis of PBL was conducted among 98 faculty who had implemented it as shown in Table 4. Analysis shows that its strengths include the development of 21st-century skills like critical thinking, clinical reasoning, communication, and self-directed learning; faculty found that PBL increased active engagement, deeper conceptual understanding, and long-term retention through student-centered, collaborative learning; it promotes higher-order thinking and meaningful reflection. But several weaknesses in the implementation of PBL exist, such as limited resources, lack of trained facilitators, inconsistent case design, and the inability to assess students; student engagement can be variable depending on motivation or group dynamics. There are still major opportunities for PBL integration with CBME

curriculum, AETCOM, early clinical exposure, real-world readiness, faculty development, interdisciplinary learning, but challenges such as faculty resistance, infrastructure limitations, and problems with curricular alignment continue to hamper its widespread and sustainable use.

Discussion

The divergence in perceptions between experienced and inexperienced faculty in conducting PBL highlights a critical bottleneck in PBL adoption. Faculty members with hands-on facilitation experience acknowledge PBL's ability to promote critical thinking and deep, long-term learning, but those without such experience are far more doubtful or impartial. The passive exposure to PBL theory is insufficient to change faculty minds. Medical schools must provide opportunities for experiential training, such as peer observation of active tutorials or co-facilitation programs, to help inexperienced faculty recognize the pedagogical value of PBL in order to get past this obstacle [6, 7].

Furthermore, the sharp disparity in opinions about curriculum integration implies that active participation is the only way to fully realize PBL's capacity to bridge basic sciences and clinical disciplines. Curriculum coordinators must understand that integration is a learned pedagogical practice rather than an obvious result of a syllabus. Instead of presuming that faculty members will understand these connections on their own, training programs should specifically address how to plan and conduct sessions that connect horizontal and vertical disciplines [8].

A noteworthy point of disagreement is whether PBL is appropriate for pre-clinical students in Phase 1 or Phase 2. Experienced faculty show extreme caution, probably because they think early-stage students lack the maturity needed for self-directed

learning, while inexperienced faculty are very optimistic. Institutions should adopt a gradual, scaffolded approach instead of completely excluding pre-clinical students from PBL. Instead of immediately plunging learners into complex, unstructured scenarios, PBL problems and facilitation styles must be dynamically tailored to the learner's developmental stage to build their capacity for self-directed learning gradually [9].

A deeper misperception of the facilitator's role is revealed by the worry that student-led conversations could spread false information. In reality, a facilitator is in charge of directing group dynamics to clarify misunderstandings, uphold scientific accuracy, and maintain educational value [10]. Lack of formal training in facilitator techniques is main concern, resulting in inflexible and inefficient implementations. Institutions must create long-term, sustainable faculty development and peer-mentoring programs in order to address this issue, going beyond one-time workshops [11]. Particularly in developing areas, inter-institutional cooperation provides a very useful way to develop these skills [12].

In consort with our SWOC analysis, PBL is excellent at increasing students' communication and self-confidence, but it also requires a significant amount of resources, adds to the workload of facilitators, and makes it difficult to assess group dynamics. Risk of facilitator burnout and student disengagement are associated with the curriculum if institutions do not actively address these resource limitations. Practically speaking, medical schools need to make investments to create and maintain localized case banks. Furthermore, incorporating evidence-based digital scaffolding tools, like eMedLearn, can assist in organizing and structuring clinical reasoning, which lessens the cognitive and preparatory load on individual facilitators [6,13].

PBL assessment is still a significant challenge. Institutions must switch from traditional, rote-testing methods to multi-dimensional, active-learning assessments in order to successfully integrate PBL. The Self-Assessment Scale on Active Learning and Critical Thinking (SSACT) and Peer Assessment of Professional Behaviours within Groups are standardized tools that can be used practically [14,15]. Furthermore, systematic student feedback questionnaires should be used to dynamically assess facilitator performance and teaching quality in addition to assigning grades to students [16]. Large student groups, institutional resistance to pedagogical change, and inadequate infrastructure frequently pose a threat to PBL implementation [11,17]. A complete, uncompromised shift to pure PBL is often logistically impossible in low- and middle-income countries. Practically speaking, educational institutions in these settings ought to implement hybrid learning models that deliberately combine focused, high-impact PBL sessions with conventional core instruction. This provides a practical, economical solution that maximizes the advantages of active learning without taxing the current infrastructure [12, 17].

Limitation

The findings' applicability to the larger field of medical education is limited by convenience sampling and non-response bias. Due to the cross-sectional design and self-reported data, social desirability biases and temporal changes can significantly affect the results.

Recommendation

Institutions should establish standardized, hands-on faculty training and peer-mentoring programs to bridge the gap between PBL theory and active

facilitation. Create digitally scaffolded clinical case banks and use multi-dimensional assessment tools combined with systematic student feedback mechanisms. Future research should assess long-term

student learning outcomes, retention rates, and changing faculty satisfaction patterns using multicentric designs and longitudinal tracking.

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How to cite this article:

Sindhuri R, Narayan KA, Rajaraman N, Raja VP. Faculty perceptions and practices of problem-based learning in India: strengths, weaknesses, opportunities, and challenges. *J Krishna Inst Med Sci Univ.* 2026; 15(2): 76-88

■ Submitted: 10-Jan-2026 Accepted: 11-March-2026 Published: 01-April-2026 ■