

# Perception and feedback of Medical Students about Formative Assessment of Self-directed learning skill in a Medical College in North India

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## Abstract

**Background:** Competency-Based Medical Education (CBME), introduced by the National Medical Commission (NMC) in 2019, emphasizes formative and summative assessments to promote competency development among medical graduates. This study aimed to evaluate medical students' perceptions and feedback regarding formative assessment of SDL. The aim and objective is to assess the perceptions and feedback of undergraduate medical students regarding formative assessment of self-directed learning in a medical college in North India. **Material and Methods:** A cross-sectional study was conducted among 131 MBBS students from different phases of training after obtaining ethical clearance. Data were collected using a structured questionnaire based on a five-point Likert scale. The questionnaire included demographic details and items related to formative assessment and self-directed learning. Responses ranged from strongly agree (5) to strongly disagree (1). Data were analyzed using descriptive statistics, including mean and median values, with IBM SPSS version 22.0. **Results:** Of the 131 participants, about 79% of students agreed that formative assessment questions reflected the skills developed during PEARLS sessions. Nearly 73% reported that formative assessments evaluated their ability to apply knowledge to real-life situations, while 79% believed that formative assessments improved their learning and academic performance. **Conclusion:** Formative assessment was perceived positively by students as an effective strategy for promoting self-directed learning, application of knowledge, and academic improvement.

**Keywords:** Self-directed learning; Formative assessment; Competency-Based Medical Education; Medical students; Feedback; Undergraduate medical education; Learning outcomes; Student perception.

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## INTRODUCTION

Medical education has progressively transitioned from traditional teacher-centered approaches to learner-centered methodologies that emphasize active participation, critical thinking, and lifelong learning. Among these, self-directed learning (SDL) has emerged as a fundamental component, enabling learners to identify their learning needs, formulate goals, access appropriate resources, and evaluate their progress independently.<sup>[1,2]</sup> This paradigm shift aligns with the principles of Competency-Based Medical Education (CBME), implemented in India by the National Medical Commission to ensure the development of competent and reflective medical graduates.<sup>[3]</sup>

SDL is particularly relevant in the context of rapidly expanding medical knowledge, where traditional didactic teaching alone is insufficient. It fosters lifelong learning, enhances critical thinking, and strengthens problem-solving abilities—core competencies required for modern medical practice.<sup>[4,5]</sup> Additionally, SDL promotes learner autonomy, adaptability, and resilience in clinical environments.<sup>[4,6]</sup> Recent evidence suggests that structured SDL interventions significantly improve knowledge retention, learner engagement, and academic performance among undergraduate medical students.<sup>[7-10]</sup>

Formative assessment plays a pivotal role in supporting SDL by providing continuous evaluation, timely feedback, and

opportunities for reflection. Unlike summative assessment, formative assessment is designed to enhance learning by identifying gaps and guiding students toward achieving defined competencies.<sup>[8]</sup> Studies have shown that integrating self-assessment, peer feedback, and faculty-guided reflection improves metacognitive skills and self-regulation among learners.<sup>[9,11]</sup> Furthermore, structured tools such as rubrics, reflective writing, and portfolio-based assessments have demonstrated significant improvement in SDL competencies, including critical thinking, collaboration, and information synthesis.<sup>[9,12]</sup>

Recent studies have highlighted the effectiveness of SDL in improving learning outcomes. For instance, SDL-based teaching modules have been associated with significant improvement in post-test scores and conceptual understanding in disciplines such

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as Community Medicine.<sup>[6,13]</sup> However, challenges including lack of guidance, time constraints, variability in learner motivation, and difficulty in accessing reliable resources continue to limit its effectiveness.<sup>[2,14]</sup>

Moreover, assessing SDL remains complex due to its multidimensional nature. Conventional assessment methods may not adequately capture SDL competencies, necessitating the use of multiple approaches such as self-, peer-, and faculty assessments, along with reflective and competency-based tools.<sup>[11,15]</sup>

Despite the recognized importance of SDL and formative assessment within CBME, there is limited evidence regarding students' perceptions and experiences, particularly in North Indian medical institutions. Understanding learners' feedback is crucial, as it directly influences engagement, motivation, and the overall effectiveness of educational strategies.

Therefore, the present study aims to assess the perception and feedback of medical students regarding formative assessment of self-directed learning skills in a medical college in North India. The findings are expected to provide insights for strengthening SDL implementation and optimizing assessment practices in undergraduate medical education.

**Aim:** To explore the perceptions of MBBS students and obtain their feedback regarding the role of formative assessment in the development of self-directed learning (SDL) skills in a private medical college.

**Objectives:** To examine undergraduate medical students' perceptions of formative assessment practices and evaluate the perceived quality and usefulness of feedback in supporting self-directed learning within a medical college in Uttar Pradesh.

## **MATERIALS AND METHODS**

**Study Design and Setting:** A descriptive cross-sectional study was carried out in a private medical college located in Uttar Pradesh. The institution has an annual intake of approximately 150 MBBS students. The study was conducted over a duration of four months, from May to August 2024.

**Study Population:** The study included undergraduate MBBS students from Phase I, Phase II, and Phase III Part I. Participants were requested to respond based on their recent exposure to formative assessment activities during their ongoing phase of training.

**Sample Size and Sampling Strategy:** A universal sampling method was adopted. All students meeting the eligibility criteria across the selected phases were invited to participate. Of the approximately 180 eligible students, a total of 131 students completed the survey, yielding a response rate of about 72.7%.

**Ethical Considerations:** The study protocol was approved by the Institutional Ethics Committee (IEC No.: IEC/RMCH/139/2024/APR). Participation was voluntary, and confidentiality of responses was ensured.

**Questionnaire Development and Validation:** Data were collected using a structured questionnaire adapted from previously validated instruments, including the framework proposed by Lim YS (2019) [9]. The tool underwent a

validation process comprising:

1. Content validation by three experts in medical education
2. Pilot testing on 20 students (excluded from final analysis)
3. Reliability assessment, which demonstrated good internal consistency (Cronbach's alpha = 0.82)

**Structure of the Questionnaire:** The questionnaire was organized into three sections:

**Section I:** Included informed consent and basic demographic details.

**Section II:** Focused on students' perceptions of formative assessment in SDL, categorized into four domains:

1. Congruence (4 items)
2. Authenticity (6 items)
3. Consultation (5 items)
4. Transparency and accommodation (5 items)

**In addition, supplementary items assessed:**

1. Preferences related to formative assessment
2. Perceived effectiveness in learning
3. Emotional reactions to feedback
4. Influence on learning behaviour and skill acquisition

Responses were recorded on a 5-point Likert scale (Annexure I).

**Section III:** Contained open-ended questions to capture students' views on:

1. Suggested improvements in formative assessment
2. Positive experiences
3. Negative experiences

**Assessment of Feedback:** Certain questionnaire items specifically evaluated:

1. Availability of feedback
2. Timeliness of feedback delivery
3. Perceived effectiveness of feedback in enhancing learning

**Data Collection Procedure:** Students were initially oriented through a brief 15-minute session explaining the purpose of the study. The questionnaire was then circulated via Google Forms. Participation was entirely voluntary, and responses were collected anonymously.

**Statistical Analysis:** Data were analyzed using IBM SPSS version 22. Likert scale responses were treated as ordinal variables. Descriptive statistics, including frequencies, percentages, means, and medians, were calculated. Responses were grouped as follows: Positive: Strongly agree and Agree, Neutral: Not sure and Negative: Disagree and Strongly disagree. No inferential statistical tests were applied, as the study was primarily descriptive in nature.

**Qualitative Analysis:** Responses to open-ended questions were analyzed using thematic content analysis. Coding was performed independently by two investigators, and final themes were derived through mutual agreement.

## **RESULTS**

A total of 131 MBBS students participated in the study to assess their perceptions and feedback regarding formative assessment (FA) in self-directed learning (SDL). 54 students (41%) belonged to Phase I, 55 students (42%) were from Phase II, and 22 students (17%) were from Phase III Part I. [Figure 1] The findings are presented across five key domains: congruence, authenticity, consultation, transparency, and preferences regarding formative assessment and feedback.

Perceived Alignment of Formative Assessment with SDL

Activities: The majority of students reported that formative assessments were well aligned with the skills and behaviours developed during SDL sessions (Positive: 74.4%, Neutral: 21.6%, Negative: 4.0%). Most respondents agreed that the assessment methods reflected their learning experiences in PEARLS and assessed competencies encouraged by faculty. Only a small proportion expressed disagreement, indicating overall satisfaction with the alignment between learning objectives and assessment strategies. [Table 1]

Perceived Relevance and Real-World Applicability of Formative Assessment: Students largely perceived formative assessments as authentic and relevant to their future roles as physicians and self-directed learners (Positive: 72.5%, Neutral: 19.7%, Negative: 7.8%). A substantial proportion agreed that these assessments contributed to real-life clinical preparedness and lifelong learning skills. However, a minority expressed concerns regarding relevance, suggesting scope for further contextualization of assessments. [Table 2] Student Involvement and Awareness in the Assessment Process: Perceptions regarding consultation and involvement in formative assessment were moderately positive (Positive: 67.6%, Neutral: 23.4%, Negative: 9.0%). While most students reported clarity about assessment types and evaluation criteria, fewer students felt they had an active role in determining how their skills were assessed. This indicates a need to enhance student engagement in the assessment design process. [Table 3]

Clarity and Transparency of Formative Assessment Practices: The majority of respondents perceived formative assessments as transparent and appropriately structured (Positive: 71.9%, Neutral: 21.7%, Negative: 6.4%). Students

reported being informed in advance about assessment timing and content, and most understood faculty expectations. Nonetheless, some students indicated uncertainty regarding marking criteria and expectations, highlighting areas for improvement. [Table 4] Student Preferences and Feedback on Formative Assessment: Students demonstrated a generally positive attitude towards formative assessment and feedback (Positive: 72.0%, Neutral: 19.5%, Negative: 8.5%). Most respondents agreed that FA enhanced their learning, promoted active engagement, and supported skill development. Feedback was perceived as beneficial in identifying areas for improvement and encouraging deeper learning approaches. However, some students reported that FA could be time-consuming or occasionally discouraging, particularly when highlighting weaknesses. [Table 5]

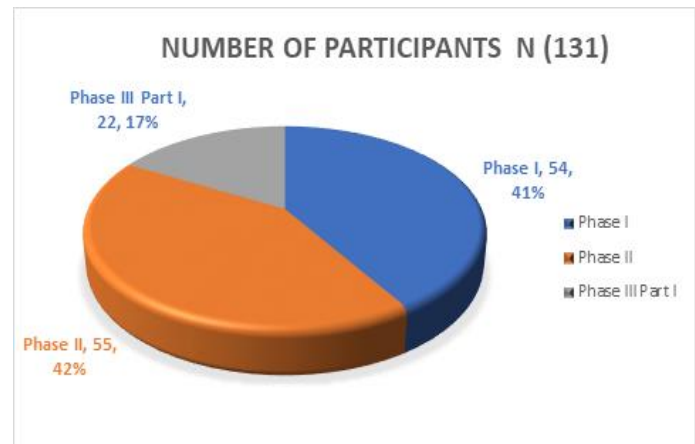


Figure 1: Phase wise Distribution of MBBS Students (Participants)

Table 1: Perceived Alignment of Formative Assessment with Self-Directed Learning Activities (Congruence)

Item	Strongly agree		Agree		I am not sure		Disagree		Strongly disagree	
	n	%	n	%	n	%	n	%	n	%
My FAs reflect the skills I have developed in PEARLS (Promoting Excellence and Reflective Learning in Simulation)- A case Based Learning Programme	22	16.8	79	60.3	24	18.3	5	3.8	1	0.8
These FAs reflect my behaviours in PEARLS	19	14.5	79	60.3	29	22.1	4	3.1	-	-
How I am formatively assessed is similar to what I do in PEARLS.	20	15.3	72	55.0	34	26.0	5	3.8	-	-
I am formatively assessed on the skills the faculty has encouraged me to develop.	21	16.0	78	59.5	26	19.8	5	3.8	1	0.8

Table 2: Perceived Relevance and Authenticity of Formative Assessment (Authenticity)

Item	Strongly agree		Agree		I am not sure		Disagree		Strongly disagree	
	n	%	n	%	n	%	n	%	n	%
These FAs are useful in preparing me for everyday life as a physician.	21	16.0	75	57.3	21	16.0	14	10.7	-	-
I find that these FAs are relevant to what I need as a physician	18	13.7	71	54.2	26	19.8	16	12.2	-	--
I can show others that the skills I have developed in PEARLS will help me do things as a physician	15	11.5	85	64.9	22	16.8	9	6.9	-	-
These FAs are useful in preparing me for everyday life as a self-directed learner.	20	15.3	69	52.7	33	25.2	8	6.1	1	.8
I find these FAs are relevant to what I need as a self-directed learner.	19	14.5	77	58.8	28	21.4	7	5.3	-	-
I can show others that the skills I have developed in PEARLS have helped me do things as a self-directed learner.	17	13.0	83	63.4	25	19.1	5	3.8	1	.8

Table 3: Student Awareness and Participation in Formative Assessment Processes (Consultation)

Item	Strongly agree	Agree	I am not sure	Disagree	Strongly disagree
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	n	%	n	%	n	%	n	%	n	%
I am clear about the types of FA being used.	20	15.3	71	54.2	28	21.4	12	9.2	-	-
I am aware of how my FAs will be evaluated	21	16.0	74	56.5	29	22.1	6	4.6	1	.8
The faculty has explained to me how each part of FA is to be used	23	17.6	63	48.1	32	24.4	13	9.9	-	-
I have a say in how my skills will be formatively assessed in the course	19	14.5	64	48.9	34	26.0	11	8.4	3	2.3
I know what is needed to successfully complete all FA questions	22	16.8	66	50.4	30	22.9	13	9.9	-	-

**Table 4: Transparency and Clarity of Formative Assessment Practices (Transparency and Accommodation)**

Item	Strongly agree		Agree		I am not sure		Disagree		Strongly disagree	
	n	%	n	%	n	%	n	%	n	%
I am told in advance when I am being formatively assessed	25	19.1	79	60.3	20	15.3	6	4.6	1	.8
I am told in advance on what I am being formatively assessed	22	16.8	79	60.3	24	18.3	6	4.6		
I am clear about what my faculty expect in the FA questions	17	13.0	71	54.2	32	24.4	4	3.1	7	5.3
I know how each FA question will be marked	22	16.8	66	50.4	35	26.7	5	3.8	3	2.3
I am given FA questions that suit my developmental stage.	20	15.3	70	53.4	31	23.7	7	5.3	3	2.3

**Table 5: Student Preferences and Perceptions of Formative Assessment and Feedback**

Item	Strongly agree		Agree		I am not sure		Disagree		Strongly disagree	
	n	%	n	%	n	%	n	%	n	%
The use of these FA improves my performance/learning.	20	15.3	84	64.1	24	18.3	2	1.5	1	.8
These FAs promote my active involvement in the development/learning process	20	15.3	81	61.8	28	21.4	1	.8	1	.8
The use of FA bores me	13	9.9	57	43.5	34	26.0	20	15.3	7	5.3
These FAs are time consuming	16	12.2	53	40.5	36	27.5	21	16.0	5	3.8
The FA feedback enhances my skill development	27	20.6	78	59.5	21	16.0	4	3.1	1	.8
I adopt a deeper approach to development/learning whenever I am corrected	23	17.6	79	60.3	25	19.1	2	1.5	2	1.5
I feel badly when my areas of improvement are pointed out	15	11.5	68	51.9	30	22.9	17	13.0	1	.8
The FA feedback is beneficial to my everyday developing	26	19.8	77	58.8	21	16.0	6	4.6	1	.8
The FA feedback helps me to identify my areas for improvement	23	17.6	86	65.6	14	10.7	7	5.3	1	.8
I like it when the faculty discusses my areas for improvement	22	16.8	75	57.3	22	16.8	10	7.6	2	1.5

## DISCUSSION

The present study demonstrates that undergraduate medical students perceive formative assessment (FA) as an effective strategy for enhancing self-directed learning (SDL), particularly in improving skill acquisition, academic performance, and application of knowledge. A majority of students (79%) reported that FA reflected skills developed during SDL sessions, consistent with the principles proposed by Knowles,<sup>[1]</sup> and supported by recent studies highlighting improved engagement and competency development through structured SDL with FA.<sup>[9,10]</sup>

Approximately 73% of participants agreed that FA facilitated application of knowledge to real-life situations, aligning with the objectives of Competency-Based Medical Education (CBME) advocated by the National Medical Commission.<sup>[3]</sup> Similar findings have been reported in national studies demonstrating improved problem-solving and contextual understanding through SDL modules.<sup>[6,13]</sup> However, some students expressed uncertainty, indicating the need for more application-oriented and case-based assessment strategies. Formative assessment was also perceived to enhance

learning and academic performance by 79% of students, consistent with evidence that continuous feedback improves self-regulation and metacognitive skills.<sup>[11]</sup> Structured feedback methods, including rubrics and reflective exercises, have been shown to strengthen SDL competencies.<sup>[12]</sup> Nonetheless, variability in responses (18.3% uncertainty) suggests inconsistencies in feedback delivery, possibly related to faculty training and implementation practices.

These findings are consistent with international evidence indicating that SDL, particularly when supported by FA, improves knowledge retention, learner autonomy, and critical thinking.<sup>[17,18]</sup> Blended learning models integrating SDL have further demonstrated improvements in motivation and problem-solving abilities.<sup>[19]</sup> However, global literature also highlights variability in outcomes, suggesting that SDL effectiveness is context-dependent and influenced by curriculum design, faculty support, and resource availability.<sup>[17]</sup>

Challenges identified in this study, including lack of guidance and difficulty in resource utilization, are consistent with both national and international reports.<sup>[2,14,20]</sup> Additionally, the multidimensional nature of SDL necessitates diverse assessment

approaches, as traditional methods may not fully capture competencies such as self-regulation and reflective ability.<sup>[11,15,21]</sup>

The findings of this study are consistent with existing literature, reinforcing that formative assessment is an effective strategy to support SDL within CBME. However, there is a need for continuous refinement in assessment design, particularly in enhancing relevance, application-based evaluation, and feedback quality

In conclusion, the findings reinforce that formative assessment is a key enabler of SDL within CBME. However, optimizing its effectiveness requires structured implementation, enhanced feedback mechanisms, faculty development, and integration of comprehensive assessment strategies.

**Strengths and Limitations:** This study provides insight into student perceptions across multiple phases of MBBS training, offering a comprehensive understanding of SDL implementation. However, being a single-center study, the findings may have limited generalizability. Additionally, perceptions were self-reported and may be influenced by subjective bias.

**Implications:** The study highlights several important implications: i) Strengthening student involvement in assessment planning may improve engagement and ownership of learning, ii) Enhancing clarity in evaluation criteria can further improve transparency, iii) Structured and timely feedback should be emphasized as a core component of SDL and iv) Faculty development programs are essential to optimize the facilitation of SDL and formative assessment.

## CONCLUSION

The present study demonstrates that MBBS students hold an overall positive perception of formative assessment within self-directed learning (SDL). The majority of students perceived formative assessment as well-aligned with learning objectives, relevant to real-life clinical practice, and effective in promoting active engagement and skill development. Feedback emerged as a critical component, facilitating deeper learning, reflection, and identification of areas for improvement.

However, the findings also highlight important gaps, particularly in terms of student involvement in the assessment process and clarity regarding evaluation criteria. A proportion of students reported uncertainty and perceived formative assessment as time-consuming, indicating the need for better structuring and communication. These observations suggest that while formative assessment in SDL is effective, its full potential can only be realized through improved transparency, student engagement, and faculty facilitation.

Overall, the study reinforces that well-designed formative assessment is integral to the success of SDL and plays a pivotal role in achieving the goals of competency-based medical education (CBME). By fostering critical thinking, self-reflection, and lifelong learning skills, formative assessment contributes significantly to the development of competent and reflective future physicians.

**Recommendations:** Based on the study findings, the

following recommendations are proposed: Enhance Student Involvement, Improve Transparency in Assessment, Strengthen Feedback Mechanisms, Faculty Development Programs, Structured SDL Framework, Promote Reflective Learning Practices and Address Student Challenges.

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## Conflicts of interest

There are no conflicts of interest.

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