Section: General Medicine

Original Research Article

"CRAFTING EXCELLENCE": BLUEPRINTING OF PAPER SETTING OF FINAL YEAR MBBS STUDENTS FOR GENERAL MEDICINE IN COMPETENCY BASED MEDICAL EDUCATION

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ABSTRACT

Background: Theory examinations are a cornerstone in evaluating MBBS students' knowledge and clinical reasoning. However, traditional paper-setting methods often suffer from subjectivity, content imbalance, and lack of alignment with the taught curriculum, leading to dissatisfaction among students and inconsistent assessment outcomes. **Aim:** To develop and implement a blueprint-based approach for final-year MBBS Medicine theory exams under the Competency-Based Medical Education (CBME) framework. **Objectives:** To assess student and faculty perceptions of blueprinting, sensitize faculty to its relevance, and evaluate its impact on teaching and assessment. **Materials and Methods:** A descriptive study was conducted at ESIC Medical College & Hospital, Faridabad. The MBBS Medicine curriculum includes 26 topics and 501 competencies, with 305 relevant to written exams. These were distributed among faculty and assigned weightages based on impact and frequency (1–3 scale). A demo exam was conducted using the blueprinting model. Student and faculty feedback was collected via Google Forms and analysed using Likert's 5-point scale. **Result:** Over 90% of students supported blueprinting, citing better coverage of important topics and reduced exam anxiety. Approximately 85% of faculty found it practical, effective, and supportive of higher-order cognitive assessment. **Conclusion:** Blueprinting enhances transparency, ensures fair and competency-aligned assessment, reduces bias, and better prepares students for clinical practice. Faculty engagement and structured implementation make it a valuable tool in improving assessment standards under CBME.

INTRODUCTION

This project focused on implementing blueprinting for final-year MBBS Medicine theory exams under the Competency-Based Medical Education (CBME) framework. Blueprinting aligns assessments with defined competencies across cognitive domains, ensuring proportional representation of topics, difficulty levels, and question formats (MCQs, SAQs, LAQs). It addresses key limitations of traditional exam systems—such as subjectivity, topic imbalance, and lack of clinical relevance—by introducing structure, consistency, and transparency in evaluation.

The CBME model, introduced by the National Medical Commission (NMC) in 2019, aims to produce Indian Medical Graduates (IMGs) who are not only knowledgeable but also clinically competent, ethically grounded, and responsive to the health needs of society. Assessment plays a pivotal role in shaping student learning, and the quality of that assessment significantly impacts learning behaviour. Unfortunately, traditional MBBS theory exams often deviate from curricular objectives, resulting in student dissatisfaction, poor reliability, and limited validity.

Students frequently report that theory exams are too lengthy, focused on obscure topics, or misaligned with what was actually taught. Moreover, the lack of

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standardisation across universities in India contributes to further confusion, impacting students' study strategies and mental well-being. This fragmented approach makes it difficult to gauge student competencies accurately and fairly.

Blueprinting offers a systematic solution. It maps each question to a specific competency, assigns weightage based on impact and frequency, and distributes questions accordingly. This ensures coverage of both "must-know" and "nice-to-know" areas, reflecting the full spectrum of the taught curriculum and preparing students for real-life clinical challenges.

This innovation project therefore aims not only to improve assessment quality but also to evaluate its effectiveness by gathering student and faculty perceptions, identifying barriers and enablers of implementation, and assessing the overall impact on learning outcomes and examination preparedness. In doing so, it contributes to the larger national goal of assessment reform and paves the way for cross-departmental standardisation in CBME-based institutions.

The aim of this study was to formulate the blueprint for paper setting for Final year MBBS students for Medicine as per Competency Based Medical Education.

MATERIALS AND METHODS

This Descriptive study was conducted at ESIC Medical College and Hospital, Faridabad, after taking approval from Biomedical Research Ethics Committee of the institute. There are 26 topics and 501 competencies in General Medicine MBBS Course as per New CBME curriculum. Out of these 305 pertains to Written Exam. Theory exam is divided into paper I and II according to UHSR, Rohtak and in major Universities like Delhi and Indraprastha University. For paper setting, these 26 topics and their competencies were divided among faculty members at ESIC Medical College & Hospital, Faridabad. All these topics and subtopics were allotted weightage according to impact and frequency.

The impact and frequency are weighted in the scale of 1-3 as Table 1. The weightage of topic is calculated as: Weightage score = Impact X Frequency.

Table 1

Impact	Weightage	Frequency	Weightage
Non-urgent/Less Public Health Importance/ Nice to know	1	Less Frequently asked	1
Serious but not immediately life threatening/Moderate public health importance	2	Moderate frequently asked	2
Life threatening emergency and or high potential for prevention impact/High public health importance/Must know	3	Frequently asked	3

a) Weightage score was calculated for each topic (I x F): Impact of topic x Frequency of asking questions from each topic).
b) Total summation of all weightage score was done and was labelled as "T".
c) Weightage coefficient (w) of each content area was calculated as (I X F)/T.

In this way, proportional weightage to various topics was allotted. It helped in including topics as per their weightage and improved validity of examinations. Data was collected and analysed taking help of the Statistician and a standardized form of division was formed. Furthermore, to study the perception of students and faculty regarding blueprinting, a validated feedback questioner on a Likert scale was prepared and administered as a google form to them. Kirkpatrick Program evaluation Model was used to study the perception of the participants regarding blueprinting of setting of final year theory exam.

RESULTS

Total 150 students and 5 faculty members participated in the study. The blueprinting of theory exams of final year was highly appreciated by participants. For transfer of learning a demo exam was conducted at the institute which also highlighted various barriers and favourable factors towards the implementation of blueprinting of theory exam. Students could respond on a scale ranging from 1 to 5 i.e. from Strongly Disagree to Strongly Agree.

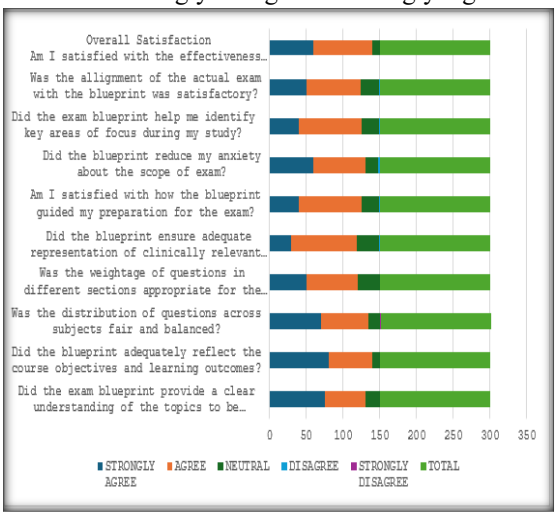

Figure 1: Perception and Satisfaction of students in setting of Blueprinting of final Year Theory MBBS Exams

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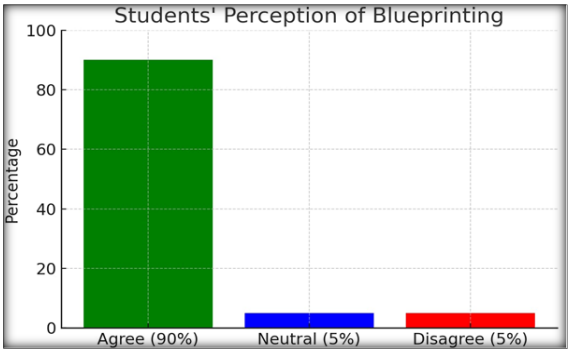
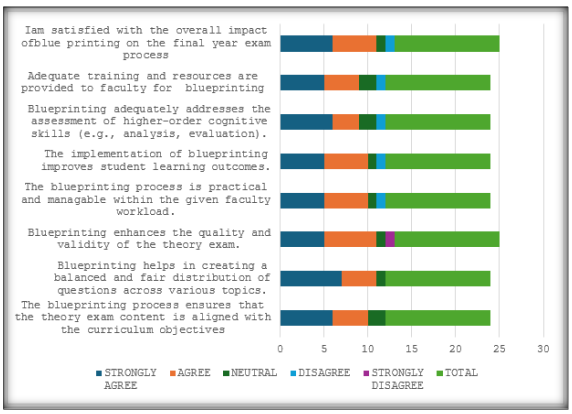
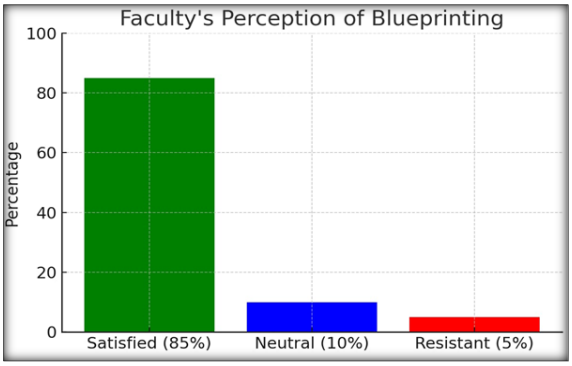


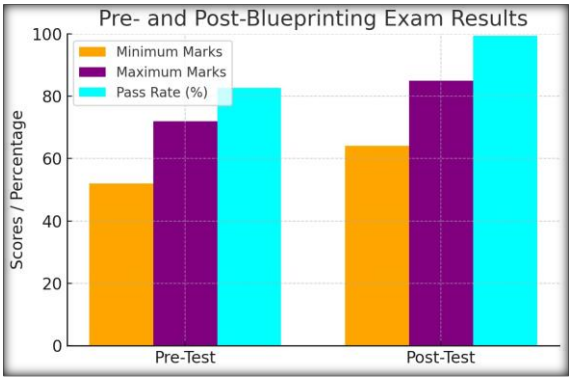
Faculty's' perception in setting of Blueprinting of final year MBBS theory exam





The Bar Chart showing the performance of the students

The students underwent two exams: which was traditionally which was made and second in which exam was set after blueprinting according to competencies under medical education.



Student Feedback: Over 90% of students agreed that blueprint-based exams effectively covered major competencies, ensured balanced representation of clinically relevant topics, and reduced exam-related anxiety. They found the format fair, structured, and helpful in guiding their preparation for university exams. Only 5% remained neutral, showing strong overall acceptance of the blueprinting approach.

Faculty Feedback: More than 85% of faculty members reported satisfaction with the blueprinting model, noting its positive impact on student learning and exam fairness. Initial resistance was addressed through training and support. After implementation, over 90% of faculty agreed that the approach was practical, aligned with real-world clinical needs, and manageable within existing workload. Some concerns (5%) persisted, but overall, the response was highly favourable.

Pre-test and Post-test Analysis of students

Pre-test analysis(before Blueprinting)	Post-Test analysis(after Blueprinting)
Total Marks- 100	Total Marks- 100
Students attended-150	Students attended- 150
Minimum marks obtained- 52	Minimum marks obtained- 64
Maximum marks obtained - 72	Maximum marks obtained- 85
Percentage of students who passed- 82.67%	Percentage of students who passed- 99.33%

Formula applied

Percentage = (Number of students who passed/Total students) X 100

The impact was clear that after making the exam based on CBME-oriented Blueprinting almost all the students showed improvement while assessing the results which was a big eye opener for the faculty to implement this method in every exam and also sensitize the faculty of other departments to adopt the much needed "Blueprinting pattern".

Overall, it was heartening to see the increased receptivity of the students as well as faculty to the implementation of blueprinting of final year MBBS theory exams. It led to the better preparedness of students for their final university exams, decreasing their stress level and increasing their confidence. Faculty was also convinced and sensitized to adapt this method after seeing overall results and impact on students.

Short come outcomes were very well achieved.

DISCUSSION

Implementing blueprinting for the final-year MBBS theory examination in General Medicine at ESIC Medical College and Hospital, Faridabad, has demonstrated robust and multi-dimensional outcomes, reaffirming its alignment with global educational reforms and CBME principles. Our results echo a growing body of literature that supports blueprinting as a tool for improving validity, fairness, and alignment of assessments with defined curricular

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outcomes. Blueprinting directly addresses the core tenets of CBME—particularly outcome-based education and competency mapping. By defining and mapping competencies to each question, educators ensure that assessments are not only representative of the curriculum but also balanced across Bloom's taxonomy levels, from recall to analysis and application. This holistic approach ensures that students are tested not merely on rote memory but also on clinical judgement, diagnostic reasoning, and critical thinking.

Our study observed improved student performance in the post-blueprinting test, with pass percentages increasing from 82.6% to 99.3%. This dramatic rise not only reflects better exam structure but also indicates improved student motivation and confidence, likely due to more transparent expectations. Students reported reduced anxiety and felt better oriented in their preparation—both hallmarks of a successful learner-centered assessment system. Furthermore, faculty feedback suggested that initial resistance was overcome through structured sensitization sessions. The majority recognized that blueprinting was manageable within existing workloads and beneficial for ensuring consistency. This is particularly relevant in government medical colleges where faculty may be overburdened with clinical and academic duties. Our project proved that with collective ownership and collaborative design, blueprinting is scalable and sustainable. The Kirkpatrick evaluation model, which we adopted, further confirmed impact at multiple levels—reaction (positive perception), learning (improved performance), and behaviour (faculty adoption). While our project did not extend to "results" in the long-term (such as improved patient care), it laid foundational work toward such downstream effects.

Comparing our findings to existing literature, similar outcomes were reported by Patil et al. (2015), who found that students perceived blueprinting as useful in preparation and felt exams were more just. Likewise, Davis and Harden (2003) emphasized that although blueprinting requires initial investment of time and training, it yields long-term benefits in fairness and outcome alignment. Kaur et al. (2020) further emphasized the role of blueprinting in curriculum planning and time management. Our study adds to this literature by offering empirical performance data (pre- and post-test comparisons), which many prior studies lacked. Additionally, our faculty's acceptance of blueprinting as "practical and realistic" reinforces the feasibility of large-scale implementation in other departments and institutions.

Importantly, blueprinting has a cascading educational effect. Students, once aware that exams are mapped to competencies, shift their learning focus from superficial to conceptual and application-based understanding. Teachers, knowing that every topic is accountable in the blueprint, diversify their teaching beyond traditional areas. Over time, this creates a ripple effect in academic culture, promoting alignment, integration, and accountability. However, some limitations were noted. A small proportion of faculty still expressed concerns over the time required and perceived rigidity in question framing. Additionally, the faculty sample size was limited (n=5), and wider feedback from multiple departments would add depth to future projects. Similarly, longitudinal studies assessing student confidence, retention, and clinical performance post-blueprinting would be valuable. Despite these limitations, our findings support the institutionalisation of blueprinting as a quality-enhancement tool. It ensures that every student is evaluated fairly, every topic gets due representation, and every faculty member contributes to a collective, accountable assessment system.

In summary, blueprinting is not just a technical exercise in question distribution—it is a pedagogical intervention that enhances transparency, reduces bias, promotes student-centered learning, and reinforces the integrity of the medical education system. It is a vital link between teaching, learning, and assessment, and should be championed across all CBME-aligned institutions.

CONCLUSION

Blueprinting of final-year MBBS theory exams enhanced the structure, fairness, and competency alignment of assessments. Feedback indicated better clarity, reduced anxiety, and improved learning outcomes among students. Faculty also reported that blueprinting was practical, equitable, and manageable within their existing workload. This project marked a transformative shift in assessment methodology, improving my own teaching practices and promoting a positive, objective-driven learning atmosphere. The success of this approach supports its integration into other departments for standardized competency-based evaluation.

Implications

1. Competency-Based Assessment: Aligns with CBME goals—assessing clinical reasoning, diagnosis, and management.
2. Streamlined Evaluation: Focused 100-mark format ensures concise yet comprehensive assessment.
3. Balanced Content Distribution: Equitable representation across systems (cardiology, neurology, etc.) avoids topic bias.
4. Student Preparation: Clear blueprint guides learning and reduces exam-related stress.
5. Faculty Training: Encourages consistent question-setting and marking practices.
6. Improved Outcomes: Well-defined, relevant assessments improve student success and curriculum delivery.

REFERENCES

1. Manjinder Kaur, Naren Kurmi, Sangita Chauhan, Anish Singhal- Blueprinting for assessment in undergraduate in

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medical physiology curriculum.2020_IJPP_65(1);60-65.DOI:10.25259.
2. .Sunita Y Patil, Manasi Gosavi, Hema B Bannur, Ashwini Ratnakar- Blueprinting in assessment: A tool to increase the validity of undergraduate written examinations.2015_Int J App Basic Med Res_S76-S79.doi:10.4103/2229
3. Competency-based undergraduate curriculum for Indian Medical Graduate. 2018;01-
4. Wormald BW, Schoeman S, Somasundaram A, Penn M. Assessment drives learning: an unavoidable truth? Anet Sci Educ. 2009;2(5):199-204.
5. Davis MH, Harden RM. Competency-based assessment: Making it a reality. Med Teach. 2003;25(6):565-68.
6. Epstein RM. Assessment in medical education. N Engl J Med. 2007;356(4):387-96.
7. Bhandare NN, Bhandare PN. Descriptive analysis of undergraduate Pharmacology question papers at Goa Medical college as regards to their content areas. 2019;01-02.

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