

Enhancing Pathology Assessment: The Role of Blueprint Awareness as an Effective Tool for Undergraduate Students

(Mejorando la evaluación patológica: El papel de la concienciación sobre el plan de estudios como herramienta eficaz para estudiantes de pregrado)

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Abstract (english)

Pathology bridges preclinical and clinical subjects, yet its assessment faces challenges such as disproportionate weightage to less relevant topics, ambiguous or repetitive questions, and inclusion of out-of-syllabus or overly rare and difficult items. These issues affect students' performance and learning. This study introduces blueprinting as a systematic approach to enhance assessment quality by ensuring proper weightage to various content areas and guiding paper setters toward creating uniform, valid assessments. To create the awareness & perception among faculty and students about blueprinting in pathology. Conducted in medical colleges around Salem, the study involves 30 pathology faculty and 100 III MBBS Phase I students. Participants were selected based on CBME guidelines & Consent were obtained. A blueprint was created by assigning impact and frequency scores to 36 competencies and validated by subject experts. Feedback from faculty and students was collected post-implementation through questionnaires to evaluate their awareness and perception. The questionnaire-based feedback assessed the effectiveness of the blueprint in improving the assessment process. The analysis focused on faculty and student responses to the blueprint's relevance and utility. Blueprinting is a vital tool for developing question papers for model and summative assessments. It ensures alignment with learning objectives, fosters validity and fairness, and provides clear guidance for outcome evaluation. Implementing blueprinting in pathology assessments enhances educational quality and better prepares students for clinical practice.

Keywords(english)

Blueprinting, Pathology, Summative Assessment, Medical Education, Validity, Structured Examination.

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Resumen(español)

La patología sirve de puente entre las materias preclínicas y clínicas, pero su evaluación enfrenta desafíos como la ponderación desproporcionada a temas menos relevantes, preguntas ambiguas o repetitivas, y la inclusión de ítems fuera del programa de estudios o excesivamente raros y difíciles. Estos problemas afectan el rendimiento y el aprendizaje de los estudiantes. Este estudio presenta la elaboración de planes de evaluación como un enfoque sistemático para mejorar la calidad de la evaluación, asegurando una ponderación adecuada a las diversas áreas de contenido y guiando a los elaboradores de exámenes hacia la creación de evaluaciones uniformes y válidas. El objetivo es crear conciencia y percepción entre el profesorado y el alumnado sobre la elaboración de planes de evaluación en patología. El estudio, realizado en facultades de medicina de los alrededores de Salem, involucró a 30 profesores de patología y 100 estudiantes de tercer año de Medicina (fase I). Los participantes fueron seleccionados según las directrices de la CBME y se obtuvo su consentimiento. Se creó un plan de evaluación asignando puntuaciones de impacto y frecuencia a 36 competencias, el cual fue validado por expertos en la materia. Se recopiló retroalimentación del profesorado y el alumnado después de la implementación mediante cuestionarios para evaluar su conocimiento y percepción. La retroalimentación basada en cuestionarios evaluó la efectividad del plan de evaluación para mejorar el proceso de evaluación. El análisis se centró en las respuestas del profesorado y el alumnado sobre la relevancia y utilidad del modelo. El uso de modelos es una herramienta fundamental para elaborar cuestionarios para evaluaciones modelo y sumativas. Garantiza la alineación con los objetivos de aprendizaje, fomenta la validez y la equidad, y proporciona una guía clara para la evaluación de resultados. La implementación de modelos en las evaluaciones de patología mejora la calidad educativa y prepara mejor a los estudiantes para la práctica clínica.

Palabras clave(español)

Diseño de planes, patología, evaluación sumativa, educación médica, validez, examen estructurado.

Introduction

Pathology is a pivotal subject in medical education, bridging preclinical concepts and clinical applications. Summative assessments in pathology often face challenges in question paper design, including unequal weightage to topics and questions of limited clinical relevance. These inconsistencies impact students' preparation and learning outcomes. Blueprinting provides a systematic approach to designing assessments by assigning appropriate weightage to content areas, ensuring alignment with learning objectives, and addressing public health relevance.

This study aims to assess awareness of blueprinting among faculty members and students in pathology and evaluate its role in improving the quality of summative assessments. By addressing common pitfalls and providing structured guidance, blueprinting serves as a tool for creating reliable and valid examinations.

Objectives

1. To create awareness among pathology faculty members about the importance of blueprinting in assessment.

2. To evaluate faculty and student perceptions of the role of blueprinting in summative assessments.

Materials and Methods

This cross-sectional observational study was conducted among pathology faculty and undergraduate students at medical colleges in Salem.

Study Participants. Sample Size: 30 Pathology faculty members and 100 undergraduate students from III MBBS Phase I.

Inclusion Criteria. MBBS Faculty members above the Assistant Professor cadre and students enrolled in III MBBS Part I.

Exclusion Criteria. Dental Faculty members & Nursing Faculty members

Study Design. The blueprint for pathology assessments was designed based on impact scores (I) and frequency scores (F) assigned to competencies:

- Frequency Weight: Rarely seen (1), Relatively common (2), Very common (3).

- Impact Scores: Topics with little/no clinical importance (1), moderate clinical application (2), and high clinical application (3). (Table – 1 - Blueprint Example for Pathology Paper II)

Steps in Study Implementation. 1. Identification of study group; 2. Sensitization of participants to blueprinting; 3. Presentation of the designed pathology blueprint; 4. Faculty discussions to identify pitfalls and challenges; 5. Data collection and analysis.

Table. 1. Blueprint Example for Pathology Paper II.

Topics	LAQ (15 marks)	SAQ (5 marks)	BAQ (2 marks)	MCQ (1 mark)	Total Marks
Cardiovascular System & Blood Vessels	1			16	16
Respiratory System		1	2	7	10
Gastrointestinal System & Oral Cavity		1	2	4	7
Hepatobiliary System	1		2	1	10
Renal System & Lower Urinary Tract		1		16	16
Total	2x15=30	6x5=30	10x2=20	20x1=20	100

Results

Feedback has obtained from the participants. (Table -2). Regarding the distribution of Topics: 61.1% agreed and 38.9% strongly agreed that the distribution was uniform. In alignment with Objectives: 38.9% agreed and 61.1% strongly agreed. Depth of Knowledge Assessed: 44.4% agreed, 50% strongly agreed, and 5.6% remained neutral. Structured Question Format: 88.9% agreed and 11.1% strongly agreed. Weightage and Public Health Relevance: 33.3% agreed, 55.6% strongly

agreed, and 11.1% were neutral. Validity of Exams Enhanced by Blueprinting: 77.8% strongly agreed and 16.7% agreed.

Discussion

Blueprinting is an essential tool in educational assessment, ensuring alignment between learning objectives, teaching strategies, and evaluation methods. This study explored the role of blueprinting in pathology summative assessments, highlighting its impact on the quality and fairness of examinations.

Table. 2. Feedback from participants revealed significant insights into the effectiveness of blueprinting.

	Strongly Agree	Agree	Neutral	Disagree
Whether the distribution of topics was uniform?	37.4	47.3	13.2	-
Whether the questions were aligned with Objectives?	37.4	48.4	13.2	-
Whether the questions were aligned with Knowledge, skill & Attitude?	37.4	51.6	8.8	-
Whether the questions were assessed in depth knowledge?	34.1	54.9	9.9	-
Whether the questions were asked according to Must know area, Desirable to know area & Nice to know areas?	36.3	51.6	11	-
Whether the questions were assessed in the critical condition?	28.6	51.6	17.6	-
Whether the questions were asked in structured way?	35.2	51.6	17.6	-
Whether the questions were asked according to the proper weightage & Impact of Public health importance?	30.8	54.9	12.1	-
List the advantages of Blueprinting.	Easy for preparation, Helpful & know the weightage of all chapters, Helps for concentration. Helpful for mark allotment, consistency & clarity.			

In an assessment, using various question formats (e.g., essay questions, short essay questions, and short answer questions) offers both advantages and disadvantages. Incorporating a mix of formats helps mitigate potential errors associated with relying on a single type of question. (1) The results demonstrate that blueprinting enhances the validity and reliability of summative assessments by aligning questions with predefined learning objectives. (2)

Assessment is a pivotal component of medical education, driving learning and improving educational outcomes.(3) Blueprinting facilitates systematic question paper design by ensuring balanced representation of syllabus content, aligning questions with objectives, and emphasizing clinically relevant topics.(4,5) This approach addresses construct over-representation and under-representation, ensuring a holistic assessment of students' knowledge and skills.

In review of various literatures, has also informed that the use of a blueprint in assessment ensures thorough coverage of all aspects of the curriculum, learning objectives and educational domains. (2, 6, 7) This will give better idea for medical students of being trustworthy & it will be a guide, motivating factor & uniform assessment.(8)

By mapping questions to cognitive domains, such as recall, comprehension, and application, blueprinting ensures a balanced representation of topics and competencies. This approach addresses concerns about potential biases or gaps in traditional assessment methods (3, 4).

Furthermore, implementing blueprinting improves transparency in assessment design & easy for Evaluators. Students benefit from clarity regarding what is expected, reducing ambiguity and anxiety about exams. (9) Faculty members also reported that blueprinting provides a structured framework for creating questions, reducing redundancy, avoiding repeat questions and promoting consistency across assessments.

However, there are some challenges associated with blueprinting were also evident. The process is resource-intensive, requiring collaboration among faculty members, thorough understanding of learning objectives, and iterative revisions. Institutions with limited staff or time constraints may find it challenging to adopt blueprinting comprehensively. (10) Despite these challenges, the long-term benefits of improved assessment quality outweigh the initial investment of time and resources. Overall, the use of a blueprint in a summative assessment paper had a positive impact on faculty perceptions.

Novelty :- Pathology, being a core subject in medical education, is often perceived as challenging due to its vast content and complexity. The study provides novel insights into how blueprint awareness can mitigate these challenges, making it particularly relevant for this critical discipline. If successful, the findings could have broader implications beyond pathology, serving as a scalable model for other disciplines where structured and high-stakes assessments are prevalent.

Innovative : - This study's innovative approach to linking blueprint awareness with improved outcomes positions it as a significant contribution to educational methodologies in medical and allied sciences.

In conclusion, Blueprinting plays a vital role in developing structured, valid and reliable assessment tools for pathology. By bridging the gap between educators and students, it ensures meaningful evaluations and fosters better educational outcomes. The study highlights the need for widespread adoption of blueprinting in medical education and recommends extending future research to assess its long-term effectiveness and validity. Continued efforts to integrate blueprinting into assessment practices, alongside addressing logistical challenges, can significantly improve medical education outcomes. Novelty of this study is to ensure that it meets both learner and institutional goals.

Limitations

One limitation of this study is its cross-sectional design, which provides a snapshot rather than longitudinal insights. Future studies could explore the sustained impact of blueprinting over multiple assessment cycles, evaluating its influence on student performance and faculty development.

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