

# ASSESSMENT BLUEPRINT OF A TEACHING MODULE

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## BACKGROUND OF ASSESSMENT BLUEPRINT

Learning is a lifelong process. Learning can be improved if it is assessed properly. Assessment is a stimulus for learning in the context of principles of assessment. Proper assessment not only enhances quality of learning but also improves the quality of future assessments<sup>1</sup>.

Assessment almost always drives learning<sup>2</sup>. Assessment is one of the many components of evaluation of a curriculum. It helps experts to grade the students, analyse the effectiveness, level of difficulty, and room for improvement of assessment tools for future examinations<sup>3</sup>. Using the Miller's pyramid, medical teacher can apply assessment tools on "knows", "knows how", "shows how" and "does" levels depending on item centred and performance centred assessment<sup>4</sup> (Figure 1). Assessment is almost always conducted on the basis of learning objectives<sup>5</sup>.

Assessment of students is one of the most important jobs of a physician as a medical teacher. Unfortunately, most of the time, we assess students in a non-scientific way due to lack of knowledge on how to calculate cut off score, how to arrange standard setting and assessment blueprint. Furthermore, there are no conscious efforts on our behalf to align assessment blueprint to learning outcomes set forth in the curriculum. All these factors can lead to chaos and a lot of criticism from students and senior faculty members on our assessment techniques and we as teachers maybe unable to defend ourselves most of the times as there

may be no one amongst us having sound knowledge of principles of assessment and their implications. To overcome these obstacles, one needs to adopt an approach which is reliable, valid, acceptable to students and faculty, cost effective and has an educational impact on future learning activities<sup>4</sup>. The ultimate goals of such assessment are to: set high professional standards and protect community from incompetent doctors, provide direction and motivation for learning in all the domains of Bloom's taxonomy and fulfil community expectation of self-regulation and continuous professional development<sup>6</sup>. According to Vleuten, assessment drives learning<sup>7</sup>. Students are much more motivated to learn those perspectives of the curriculum which will be assessed and will be having an impact on their grades<sup>8</sup>. To design assessment tasks, experts develop vital but meaningful performance criteria that assist them to provide evidence to differentiate candidates who are competent from those who are not. Standard setting is the term applied for this process. Standard setting in examination is the procedure to determine the passing score which in turn is the cut off score between competent and non-competent<sup>9</sup>. Standard setting can be categorised as relative (norm- referenced) or absolute (criterion- referenced).<sup>10</sup> The relative standards basically differentiate between a group of passing and failing examinees relative to the performance of some well-defined group and the passing score (standard) will depend on the performance of the specific group tested. On the other hand, absolute standards are based on a predetermined level of competency that does not rely on the performance of the group<sup>11</sup>. Generally, there is

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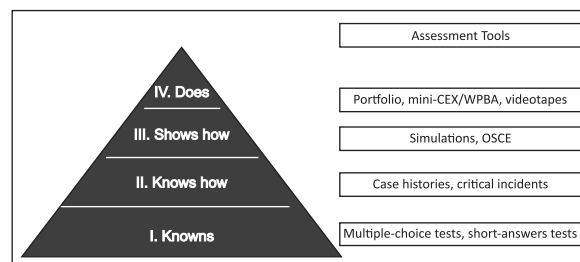


Figure 1: Miller Pyramid

## Assessment blueprint of a teaching module

**Table 1:**

Learning Outcomes <sup>18</sup>	Domain <sup>18</sup>	Level <sup>18</sup>	Page No. <sup>18</sup>
1.	3	4	13
2.	8	4	27
3.	4	4	15
4.	10	4	32
5.	1	4	9
6.	2	4	11
7.	2	4	11
8.	9	4	29
9.	9	4	29
10.	6	4	23

no gold standard in selecting the method of standard setting and the choice depends on the purpose of the examination, availability of content, experts and practicality.<sup>12</sup> Absolute standards are mostly applicable in high stake assessments to discriminate competent from the non-competent. Relative standards are usually applied for selection purposes or admission in institutions where limited numbers of seats are available. Because of the significance, criterion referenced standard settings are most appropriate in medical education.<sup>13</sup> Criterion referenced standard settings are further categorised into test (item) centred setting and examinee (performance) centred settings. Criterion-referenced test-centred methods are arranged to mark a passing score for the assessment of knowledge domain e.g.; multiple choice questions (MCQs). For this purpose, experts are invited to judge the level of performance required on each item

**Table 2: Mapping of learning outcomes against Scottish Doctor 3 and PMDC Guidelines 2011**

Learning Outcomes	Scottish Doctor 3 Outline <sup>18</sup>	PMDC Curriculum Guideline <sup>19</sup>
1. Formulate a complete and logical plan for laboratory investigations in patients with acute and chronic viral Hepatitis	Domain 3, Level 4 (Page No: 13)	Skilful graduate to order appropriate investigations (Page No: 12)
2. Differentiate the clinical features of acute viral hepatitis from other febrile illnesses in terms of onset, duration and pathophysiology	Domain 8, Level 4 (Page No: 27)	Knowledgeable graduate to differentiate between the clinical features of various disease processes (Page No: 14)
3. Design a management plan on the basis of history, physical examination and laboratory findings in a patient with acute viral hepatitis according to local protocol/guidelines	Domain 4, Level 4 (Page No: 15)	Skilful graduate to formulate a management plan for the Disease (Page No: 13)
4. Argue against specific dietary restrictions in patients with viral hepatitis	Domain 10, Level 4 (Page No: 32)	Problem solver graduate to critically evaluate existing knowledge to solve a problem (Page No: 16)
5. Perform clinical examination in patient with hepatomegaly independently	Domain 1, Level 4 (Page No: 9)	Skilful graduate to perform clinical examination to identify specific problem and differentiate from others (Page No: 12)
6. Skilfully perform male and female urinary catheterization under aseptic conditions.	Domain 2, Level 4 (Page No: 11)	Skilful graduate to perform procedures with the consent of patient ensuring infection control (Page No: 12)
7. Establish an Intravenous line aseptically in a critically ill patient	Domain 2, Level 4 (Page No: 11)	Skillful graduate to perform procedures with the consent of patient ensuring infection control (Page No: 13)
8. Take history with respect and perform clinical examination with consent	Domain 9, Level 4 (Page No: 29)	Professional graduate to demonstrate caring attitude towards patients and health problems (Page No: 18)
9. Reassure a patient with viral hepatitis and discuss treatment options	Domain 9, Level 4 (Page No: 29).	Professional graduate to demonstrate caring attitude towards patients and health problems (Page No: 18)
10. Counsel the patient and his/her family members about preventive measures, dietary/hygienic precautions and vaccination.	Domain 6, Level 4 (Page No: 23)	Skilful graduate to advice and counsel the patients and their family members for appropriate health promotion and disease prevention (Page No: 13)

## Assessment blueprint of a teaching module

**Department of General Medicine**  
**Module: Acute and chronic viral hepatitis and their management**  
**Duration: 2 weeks**

Learning outcome	Hours	MIT	Assessment			
By the end of academic session, students will be able to:			Miller's pyramid	Assessment instrument	Standard setting	Post- exam analysis
1. Formulate a complete and logical plan for laboratory investigations in patients with acute and chronic viral Hepatitis (D3,L4)	6	Bedside teaching/ Lectures/ SGD	Knows/ Knows how	MCQ's/EMQ's/ SAQ's	Angoff method	Difficulty index/ Discrimination index/ Distractor analysis
2. Differentiate the clinical features of acute viral hepatitis from other febrile illnesses in terms of onset, duration and pathophysiology (D8,L4)	6	Bedside teaching/ SGD	Knows/ Knows how	MCQ's/EMQ's/ SAQ's	Angoff method	Difficulty index/ Discrimination index/ Distractor analysis
3. Design a management plan on the basis of clinical history, physical examination and laboratory findings in a patient with acute viral hepatitis according to local protocol/guidelines (D4,L4)	8	Bedside teaching/ SGD	Knows/ Knows how  Shows how	MCQ's/EMQ's/ SAQ's  OSCE	Angoff method/ Borderline group	Difficulty index/ Discrimination index/ Distractor analysis
4. Argue against specific dietary restrictions in patients with viral hepatitis (D10, L4)	6	Bedside teaching/ SGD	Knows/ Knows how  Shows how	MCQ's/EMQ's/ SAQ's  OSCE	Angoff method/ Borderline group	Difficulty index/ Discrimination index/ distractor analysis
5. Perform clinical examination in patients with hepatomegaly independently (D1, L4)	8	Clinical skill lab	Shows how	OSCE	Borderline group	
6. Skilfully perform male and female urinary catheterization under aseptic conditions (D2, L4)	6	Clinical skill lab	Shows how	OSCE	Borderline group	
7. Establish an Intravenous line aseptically in a critically ill patient (D2, L4)	6	Clinical skill lab	Shows how	OSCE	Borderline group	
8. Take history with respect and perform clinical examination with consent (D9, L4)	6	Role play	Shows how	OSCE	Borderline group	
9. Reassure a patient with viral hepatitis and discuss treatment options (D9, L4)	10	Role play	Shows how	OSCE	Borderline group	
10. Counsel the patient and his/her family members about preventive measures, dietary/hygienic precautions and vaccination (D6, L4)	10	Role play	Shows how	OSCE	Borderline group	

of the test or task to meet the standard (minimal proficiency). Angoff, Ebel and their various modifications, Nedelsky and Bookmark procedures are examples of test-centred methods.<sup>14</sup>

In contrast, criterion-referenced examinee-centred methods set a standard based on global judgments of performance by a group of qualified expert panellists. This approach is particularly well suited to mark a cut off score on OSCEs and workplace based assessments. Contrasting groups' method and the borderline group method are two popular examinee centred standard setting methods.<sup>15</sup> Hofstee method is an example of compromise method in standard setting that incorporates the advantages of both norm reference and criterion reference standard setting procedures.<sup>16</sup>

Assessment in medical education should validate the objectives set by the curriculum. Test content should be diligently planned against these learning objectives and this process is known as assessment blueprint.<sup>17</sup>

An assessment blueprint of 10 learning outcomes from General Medicine in the module of acute and chronic viral hepatitis and their management in accordance with the guidelines set for the curriculum of MBBS by Pakistan Medical and Dental Council (PMDC) 2011 is formulated as an assignment for Curriculum session of 2 year Master training program (MHPE) under the supervision of Institute of Health Professions Education (IHPE&R), Khyber Medical University Peshawar.

### METHODOLOGY OF ASSESSMENT BLUEPRINT

Assessment drives learning and assessment must always be on the basis of learning outcomes as outlined in the curriculum<sup>8</sup>. Keeping these facts in mind, we first select ten learning outcomes in the speciality of Internal Medicine (Module: Viral Hepatitis) from the domains of Bloom's taxonomy for the undergraduates of Khyber Medical College, Peshawar. These learning outcomes are prepared in accordance with the domain and level as outlined in Learning Outcomes for the Medical Undergraduate in Scotland (Scottish Doctor 3)<sup>18</sup> (Table 1). These learning outcomes are then mapped against Scottish Doctor 3 and PMDC Guidelines 2011 as documented in Table 2.

PMDC Guidelines 2011 have allotted total 4 weeks to the combined module of Gastrointestinal tract (GIT) and Hepatobiliary system (Page No. 29), that is why we allocated 2 weeks to our module on acute and chronic viral hepatitis and their management.<sup>19</sup> Each week comprises of 42 student learning hours (36 hours/week at institution and one hour study daily at home), so 2

weeks are 84 hours. According to ECTS (European Credit Transfer System), 25 student learning hours are equivalent to one credit, so this module is equal to 3.36 credit hours (Page No. 24). Eighty percent attendance will be mandatory for each student to be eligible to take part in assessment module (Page No.24).<sup>19</sup>

An interactive lecture will deliver factual knowledge at knows / knows how level of Miller pyramid. It is still considered to be a good option keeping in mind the large number of students in KMC (272). Meanwhile, small group (not more than 10 students) discussion (SGD) is another effective way of teaching where students of each small group are allotted different tasks which they discuss with one another in the group and then present to the whole class. The best way of learning is to teach others.<sup>20</sup> Bedside teaching is also a form of small group format at hospital setting where teaching activity takes place in real life scenario and students get opportunity to observe clinical features of viral hepatitis, formulate differential diagnosis and management plan and develop critical thinking. Clinical skills laboratory is an excellent mode of information transfer (MIT) for the skill domain of Bloom's taxonomy at the shows how level of Miller pyramid. Manikins will be utilized for invasive procedures like urinary catheterization and establishing IV lines while simulators will be used for clinical examination under supervision. Role play is an excellent MIT for the attitude domain of Bloom's taxonomy at the shows how level of Miller pyramid. The teachers themselves and videos of simulators can be utilized for the purpose of role play.

Multiple choice questions (MCQ's), extended matching questions (EMQ's) and short answer questions (SAQ's) are the assessment tools for knows/ knows how levels of Miller pyramid and Objective structured clinical examination (OSCE) is used as assessment tool for the shows how level of Miller pyramid. Angoff method is used as preferred method of standard setting for the assessment of test centred examination. This is just due to inherent simplicity of Angoff method, extensive research available, its implications in number of examinations including MCQ's and even performance based assessments, its easiness for the panellists, giving compensatory cut off score and its application before the administration of test.<sup>10,21</sup>

Borderline method will be used as standard setting for the assessment of performance centred examination just due to conceptual simplicity of the method and familiarity of the panellists with the individual examinees.<sup>22</sup> Post examination analysis will be performed on the basis of difficulty index, distractor analysis and discrimination index.<sup>23</sup>

## Assessment blueprint of a teaching module

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