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SHORT COMMUNICATION

Effective Assessment Systems in Medical Education: Our Current Practices and the Way Forward

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Assessment systems in medical education are crucial for assessing the knowledge, skills, and attitudes of the future healthcare professionals such as doctors, dentists, pharmacists, physiotherapists and other allied healthcare professionals. These systems ensure that the undergraduate medical students and fellowship trainees meet the necessary standards for becoming safe and effective practitioners and specialists. Globally, there is growing awareness about making assessment systems more robust and effective drivers of learning. Also, there are more conscious efforts to remove the undesirable sting associated assessments. The three major recognized forms of assessments include: 1) Formative Assessment: It is done during the learning process and provides feedback to the students to improve their learning. Formative assessments can take various forms, such as quizzes, small group discussions, or feedback from preceptors during clinical rotations; 2) Summative Assessment: This is used to assess the student performance at the end of a learning period, such as a course, rotation or training. These assessments are taken in the form of written exams, practical skills assessments, or Objective Structured Clinical Examinations (OSCEs); and 3) Programmatic assessment. Here a continuum of stakes is used and meaningful feedback is provided to the earners, thus ensuring more robust learning. This removes the pass/fail decision from the typical single event of summative assessment.

A combination of these forms of assessment is often employed in medical education to ensure a comprehensive assessment of students' knowledge, skills, attitudes, and professionalism; thus, ensuring their robust preparation for future safe clinical practice and service to humanity.

Following are the common current practices and policies regarding the assessment of students' learning in most of our medical colleges and medical universities:

1. The entire focus of the medical education and training is on the single event of summative assessment (commonly known as the "exit exam") which is conducted by the governing medical college, the medical university or the College of Physicians and Surgeons Pakistan (CPSP). The undergraduate students are assessed by the relevant medical college or University whereas the CPSP conducts the summative assessments (entailing high-stakes-pass/fail judgments) of the postgraduate trainees pursuing the college's fellowships in various specialties. Following are some of the major flaws associated with the current focus of these assessments:
    a. The exit exam predominantly assesses the "Knows, Knows-how and Shows-how" components of the Miller's pyramid. The more crucial components of the "Does" and "Is" are largely missed in the assessments.

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b. In the majority of cases, there is lack of congruence between what is formally taught to the students and what is assessed in their exam.

c. The single terminal event of exit exam decides the fate of the students (in terms of pass or fail) without providing them any formal feedback.

d. There is no system to assess readiness to progress to next year in the postgraduate residency programmes. Once the trainee enters the training, there is no formal examination to assess the progress of learning.

e. Instead of the aforementioned current practices and policies, the focus should be shifted equally towards the formative assessment (along-side the summative assessment). This in turn will cause meaningful enhancement of the learning and performance of our students.[1-3] Additionally, ongoing research on the assessment systems is crucial for ensuring validity, reliability, and fairness in assessing medical learners.

2. In the majority of our medical colleges and universities, there is total or partial lack of any formal system of formative assessment and feedback. This results in the following adverse repercussions:

   a. Assessment driven learning and motivation of the students is missing.

   b. Students' progress during education and training is neither regularly monitored nor communicated to the students. Shortcomings in the student's learning and performance are thus not identified during the training. Hence timely remediation cannot be instituted.

   c. The culture of providing the crucial and frequent feedbacks to students by teachers is largely missing. Students need timely and specific feedback regarding their progress in order to make desired improvements in their deficient learning and performance.

   d. Assessment as a tool to support learning is missing.

   e. Assessment-led innovation in curriculum is not present.

   f. As there is absence of regular formative assessments, flaws in instruction or weak teaching strategies are not being identified. Hence useful feedback for the teachers is also non-existent.[4-6]

3. House job represents the most neglected grey area of capacity-building and training of the new budding doctors. The learning is largely situational, depending on the quality of the unit (with respect to the case volume and case mix), type of the hospital (public versus private), and the expertise and attitudes of consultants and peers. There exists no structured schedule for any prescribed learning activities. The doctor spends one year, simply to get a certificate that enables him to practice medicine or opt for sitting the FCPS-part 1 exam.

4. The programmatic assessment is not only missing but there is also lack of its recognition on part of our teaching faculty. The programmatic assessment beautifully blends the formative and summative assessment strategies. It emphasizes maximum formative feedback to the students in individual data points. Constructive dialogue is established between the student and teacher, thus providing scaffolding for the students. The high-stakes decisions of pass-fail are based on many data points rather than individual data points. The bias of an individual assessor is considerably reduced. It is applicable to both undergraduate and postgraduate students. It aligns well to the competency-based education.[7-9]

Following is the proposed Way forward for making the Summative assessments more effective:

1. Assessment planning is a crucial component of the curriculum. As a matter of basic principle, there should be perfect alignment and congruence between the learning objectives, instruction strategies (i.e., learning experiences) and assessment tools. Unless all these three are aligned, valid assessment will not be possible. The table 1 represents the two-dimensional table of Bloom's taxonomy which serves as a foundation for ensuring this alignment. At the very outset of the assessment planning, we should have the

blueprint/ table of specification at hand while planning and designing the assessment tools.[10,11]

2. Component of feedback should also be introduced in the summative assessment. This should include detailed marks obtained by the failed candidates. Also comments of the faculty will help to appropriately guide and re-direct the learning of these unfortunate students.

3. Serious efforts should be made to introduce the programmatic assessment wherein the fruitful aspects of both summative and formative assessments would be combined. This will greatly benefit the students.[12]

4. The certification of one-year House job should be linked to formal summative assessment.

Table I: Revised Bloom's taxonomy two-dimensional table summarizing cognitive taxonomy of educational objectives.

Knowledge dimensions	The Cognitive process dimensions					
	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual						
Conceptual						
Procedural						
Metacognitive						xxxxxxx

Following are the recommendations for making formative Assessments more effective:

1. Formative assessment should be an essential component of the institutional assessment strategy alongside summative assessments. Once institutionalized, it will promote a culture of effective feedback and constructive dialogue between teachers and students.[13,14]

2. In each teaching module, there should be built-in component of formative assessment. The specific learning objectives should be stated in clear measurable terms along with instructional strategies. There should be clear indication of how the learner's progress will be assessed during the course of study. This can be applied to classroom-based learning as well as experiential learning.[15,16]

3. The formative assessments should be applied across a range of learning domains/ activities. These include:

   a) Assessment of factual and conceptual knowledge.

   b) Assessment of competence in terms of clinical skills, consultation skills, procedural skills and communication skills.

   c) Hospital based clinical placements and experiential learning.

   d) Community based placements and learning.

   e) Portfolio Assessment and reflective writing.

   f) Academic guidance interviews.[17-22]

4. Written tests in the form of multiple-choice questions (MCQs) and structured short answer questions (SAQs) should be employed to assess the factual and conceptual knowledge of the students. These should be regularly held at 3-4 months intervals according to an annual academic schedule. This will serve to motivate the students to best avail their learning opportunities on one hand. On the other hand, the faculty will have the opportunity to monitor the progress of learning, timely identify areas of deficiency, develop constructive feedback, and hence re-direct the student's learning and capacity building in the desired direction.[22]

5. The performance and skills of the students can be efficiently assessed (for formative assessment) with the help of well-designed Objective structured clinical examination (OSCE) stations. The OSCE has established validity and reliability in both the assessment "of" and "for" learning. When it is employed in assessment "for" learning, the following key modifications should be included:

   a. Allocate time at the end of each station, allowing the assessor to provide specific and timely feedback to the students.

   b. At the end of each station, return the marked checklist to the students.

   c. At the end, the assessors should meet all the students to discuss the OSCEs.

d. Videotaping of the performance should be reviewed by the students and the assessors.[23,24]

Assessment tools for the three learning domains

Knowledge: Broadly there are two types of tools:

a) Written or computer-based assessment tools. These include:

i. Multiple-choice questions (MCQs)

ii. Extended matching questions (EMQs)

iii. Short Answer Questions (SAQs)

iv. Structured SAQs

v. Essay Questions

vi. Short Essay Questions (SEQs)

vii. Modified Essay Questions (MEQs)

viii. Structured essays

ix. Problem based essays

x. Script Concordance Test (SCT)

xi. Situational Judgment Tests (SJTs)

b) Structured oral exam/ viva

In the given assessment tools, the quality and construction of the questions determine what level of knowledge and competence is assessed. For instance, the questions may test simple factual recall, conceptual knowledge, clinical problem solving or higher-level skills of synthesis and evaluation.[23,25,26,27]

Skills: The time-tested assessment tools include:

a) Objective structured clinical examination (OSCE)

b) Objective structured long examination record (OSLER)

c) Traditional long/ short cases

d) Structured long interview and clinical examination (SLICE)

e) Mini clinical evaluation exercise (Mini-CEX)

f) Direct observation of procedural skills (DOPS)

g) Case-based discussion (CbD)

h) Videotaping of performance with follow up review

Clinical and practical or procedural skills are assessed with clinical and work-based assessment tools. These tools test the candidate's performance or competence to practice medicine.[24,28,29-32]

Attitude: The assessment tools are:

a) Multi-source feedback (MSF) or 360° evaluation

b) Portfolio assessment.

Attitudes and professionalism represent a diversified array of attributes such as:

- Respect for the patient, colleagues and institutional norms.
- Integrity (moral, financial and professional).
- Respect for the psychosocial aspects of illness
- Compassion/ empathy
- Reliability
- Punctuality
- Dutifulness
- Responsibility
- Communication and teamwork skills.
- Reflection, metacognitive skills, emotional intelligence and self-assessment skills

The 360° evaluation is mainly employedfor postgraduate education and continuing medical education; however, it has the potential to be used in undergraduate medical education too.

The Portfolio entails cumulative collection of evidences/data that indicate the achievement of learning. The data include active ongoing reflection by the student on his learning experiences. Instead of being a cross-sectional snapshot; the portfolio provides evidences collected over a period of time. It is a student-centered approach to curriculum with greater responsibility reposed in students for their own learning. The Portfolio may indicate the progress of learning (i.e., Developmental Portfolio) or student's best achievement (i.e., showcase Portfolio). The Portfolios are employed predominantly for undergraduate students; however, these are equally effective for postgraduate students as well.[23,24,33,34]

References

1. Cilliers FJ, Schuwirth LW, Herman N, Adendorff HJ, van der Vleuten CP. A model of the pre-assessment learning effects of summative assessment in medical education. Adv Health Sci Educ Theory Pract. 2012;17(1):39-53. doi: 10.1007/s10459-011-9292-5.
2. Norcini J, Anderson B, Bollela V, Burch V, Costa MJ, Duvivier R, Galbraith R, Hays R, Kent A, Perrott V, Roberts T. Criteria for good assessment: consensus statement and recommendations from the Ottawa 2010 Conference. Med Teach. 2011;33(3):206-14. doi: 10.3109/0142159X.2011.551559.
3. Saaiq M, Khaleeq-uz-Zaman. Postgraduate medical education: residents rating the quality of their training. J Coll Physicians Surg Pak. 2013 Jan;23(1):72-6. PMID: 23286628.
4. Harden RM, Laidlaw JM. Six questions to ask about assessment. In: Essential skills for a medical teacher. 2nd ed, 2017: pp. 219-229. UK: Elsevier, Publishers.
5. Pangaro L, ten Cate O. Frameworks for learner assessment in medicine: AMEE Guide No. 78. Med Teach. 2013;35(6):e1197-210. doi: 10.3109/0142159X.2013.788789.
6. Shute VJ. Focus on formative feedback. Review of Educational Research 2008; 78: 153–189.
7. Govaerts M, van der Vleuten CP. Validity in work-based assessment: expanding our horizons. Med Educ. 2013;47(12):1164-74. doi: 10.1111/medu.12289.
8. Van Der Vleuten CPM, Schuwirth LWT, Driessen EW, Govaerts MJB, Heeneman S. Twelve Tips for programmatic assessment. Med Teach. 2015;37(7):641-646. doi: 10.3109/0142159X.2014.973388.
9. van der Vleuten CPM, Heeneman S, Schuwirth LWT. Programmatic assessment. In: Dent JA, Harden, RM, Hunt D (Eds.). A practical guide for medical teachers. 5th ed, 2017: pp. 295-303). Edinburgh: Elsevier.
10. Anderson LW, Krathwohl DR. A taxonomy for learning, teaching and assessment: A revision of Bloom's taxonomy of educational objectives. New York: Longman, 2001.
11. Gronlund NE. Planning for assessment. In Assessment of student achievement. 8th ed, 2006: pp. 43-54. United States: Walsh & Associates, Inc.
12. van der Vleuten CPM, Heeneman S, Schuwirth LWT. Programmatic assessment. In: Dent JA, Harden RM, Hunt D (Eds.). A practical guide for medical teachers. 5th ed, 2017: pp. 295-303. Edinburgh: Elsevier.
13. Black P, William D. Assessment and classroom learning. Assessment in Education 1998; 5:7–74.
14. Black P, William D. Developing the theory of formative assessment. Educational Assessment, Evaluation and Accountability 2009; 21: 5–31.
15. Fowell SL, Southgate LJ, Bligh JG. Evaluating assessment: the missing link? Med Educ. 1999;33(4):276-81. doi: 10.1046/j.1365-2923.1999.00405.x.
16. Moon JA. A handbook of reflective and experiential learning. 2004; pp. 149–57. London: Routledge Falmer.
17. Denison AR, Currie AE, Laing MR, Heys SD. Good for them or good for us? The role of academic guidance interviews. Med Educ. 2006;40(12):1188-91. doi: 10.1111/j.1365-2929.2006.02629.x.
18. Friedman Ben David M, Davis MH, Harden RM, Howie PW, Ker J, Pippard MJ. AMEE Medical Education Guide No. 24: Portfolios as a method of student assessment. Med Teach. 2001;23(6):535-551. doi: 10.1080/01421590120090952.
19. Hays RB. Reflecting on learning portfolios. Med Educ. 2004;38(8):801-3. doi: 10.1111/j.1365-2929.2004.01831.x.
20. Sayer M, Chaput De Saintonge M, Evans D, Wood D. Support for students with academic difficulties. Med Educ. 2002;36(7):643-50. doi: 10.1046/j.1365-2923.2002.01259.x.
21. Snadden D. Portfolios--attempting to measure the unmeasurable? Med Educ. 19 99;33(7):478-9. doi: 10.1046/j.1365-2923.1999.00446.x.
22. Wood FD. Formative assessment. In: Swanwick T (Ed.). Understanding medical education: Evidence, theory and practice. (2nd ed, 2014; pp. 317-329). London, England: Association for the Study of Medical Education (ASME), Wiley-Blackwell Publishing Ltd.
23. Harden RM. Misconceptions and the OSCE. Med Teach. 2015;37(7):608-610. doi: 10.3109/0142159X.2015.1042443.
24. Harden RM. Revisiting 'Assessment of clinical competence using an objective structured clinical examination (OSCE)'. Med Educ. 2016;50(4):376-9. doi: 10.1111/medu.12801.
25. Bandaranayake RC. Setting and maintaining standards in multiple choice examinations: AMEE Guide No. 37. Med Teach. 2008;30(9-10):836-45. doi: 10.1080/01421590802402247.
26. Lubarsky S, Dory V, Duggan P, Gagnon R, Charlin B. Script concordance testing: from theory to practice: AMEE guide no. 75. Med Teach. 2013;35(3):184-93. doi: 10.3109/0142159X.2013.760036.
27. Schuwirth LWT, van der Vleuten CPM. Written Assessment. In: Cantillon, P, Wood D (Eds.). ABC of learning and teaching in medicine. (2nd ed, 2010; pp. 38-42). UK: Wiley-Blackwell Publishing Ltd.
28. Gleeson F. Assessment of clinical competence using the Objective Structured Long Examination Record (OSLER). AMEE medical education guide No.9. Medical Teacher 1997; 19(1): 7-14. doi: 10.3109/01421599709019339

29. Khan RA, Hameed FD, Anwar M. Assessing the long case in undergraduate medical students: Development of structured, feasible, valid and reliable tool. Journal of Islamic International Medical College 2014; 9(1): 46-49.
30. Lockyer JM, Clyman SG. Multisource feedback (360-degree evaluation). In: Holmboe ES, Hawkins RE (Eds). Practical guide to the evaluation of clinical competence. Philadelphia: Mosby-Elsevier. 2008.
31. Miller GE. The assessment of clinical skills/competence/performance. Acad Med. 1990;65(9 Suppl):S63-7. doi: 10.1097/00001888-199009000-00045.
32. Norcini J, Holmboe E. Work-Based Assessment. In: Cantillon P, Wood D (Eds.). ABC of learning and teaching in medicine. (2nd ed, 2010; pp. 48-51). UK: Wiley-Blackwell Publishing Ltd.
33. Friedman Ben David M, Davis MH, Harden RM, Howie PW, Ker J, Pippard MJ. AMEE Medical Education Guide No. 24: Portfolios as a method of student assessment. Med Teach. 2001; 23(6):535-551. doi: 10.1080/01421590120090952.
34. Tochel C, Haig A, Hesketh A, Cadzow A, Beggs K, Colthart I, Peacock H. The effectiveness of portfolios for post-graduate assessment and education: BEME Guide No 12. Med Teach. 2009;31(4):299-318. doi: 10.1080/01421590902883056.