The assessment of learning outcomes

An extended summary of AMEE Medical Education Guide No 25

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Guide overview:
If teachers are to do a better job of assessing their students, they need an understanding of the assessment process, an appreciation of the learning outcomes to be assessed and a recognition of the most appropriate tools to assess each outcome. Assessment tools selected should be valid, reliable, practical and have an appropriate impact on student learning. The preferred assessment tool will vary with the outcome to be assessed. It is likely to be some form of written test, a performance test such as an OSCE in which the student’s competence can be tested in a simulated situation, and a test of the student’s behaviour over time in clinical practice, based on tutors’ reports and students’ portfolios. There should be collaboration across the continuum of education in test development as it relates to the assessment of learning outcomes and in the implementation of a competency-based approach to assessment

The Importance of Assessment
Assessment plays a major role in the process of medical education, in the lives of medical students, and in society by certifying competent physicians who can take care of the public. The very foundation of medical curricula is built around assessment milestones for students.

Outcome-Based Assessment for a Competent and Reflective Physician
Assessment is an intrinsic component of outcome-based education. Outcome-based education and performance assessment are closely related paradigms

Aim of This Guide
A critical examination of practice relating to student assessment should be undertaken in the context of the changing expectations with regard to the students’ learning outcomes. This guide describes assessment approaches for each of the specific competencies expected of students or trainees (learners).

Improved Understanding of the Assessment Process
Assessment instruments can be described according to certain prescribed criteria that are evidence-based and recognized by professionals in the field. The criteria most commonly referred to are:

1. validity
2. reliability
3. impact on the learner and educational program
4. practicality including cost.

**Use of Appropriate Assessment Tools**

Assessment instruments can be considered in five categories. These are given below together with representative instruments.

1. Written Assessments
   - Essay
   - Short Answer Questions
   - Completion Questions
   - Multiple Choice Questions (MCQs)
   - Extended Matching Items (EMIs)
   - Modified Essay Questions (MEQs)
   - Patient Management Problems (PMPs)
   - Progress Test
   - Dissertation report

2. Clinical/Practical Assessments
   - Long Cases
   - Practical Examination
   - Spot Examination
   - Objective Structured Clinical Examination (OSCE)
   - Objective Structured Practical Examination (OSPE)
   - Objective Structured Long Examination Record (OSLER)
   - Group Objective Structured Clinical Examination (GOSCE)

3. Observation
   - Tutors report
   - Checklists
   - Rating Scales
   - Patient report

4. Portfolio and Other Records of Performance
   - Logbooks
   - Portfolios
   - Procedural Logs

5. Peer- and Self-Assessment
   - Peer report
   - Self report

Each instrument brings with it, its own strengths and weaknesses, its impact on student learning and its practicality and cost.

**Assessment of the Full-Range of Learning Outcomes**
The four levels of the Miller pyramid can be matched with the assessment approaches. Written assessment is the predominant instrument at the ‘know’ and ‘know how’ levels, clinical assessment and the OSCE at the ‘shows how’ level and observation, portfolios and log books at the ‘does’ level. The recommended assessment methods for the 12 learning outcomes of a competent and reflective physician listed in order of importance:

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<tr>
<th>Learning Outcomes</th>
<th>Assessment Methods</th>
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<tr>
<td>1 Clinical Skills</td>
<td>OSCE; Observation; Logbooks; Written Examination</td>
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<tr>
<td>2 Practical Procedures</td>
<td>OSCE; Portfolios; Logbooks; Observation; Written Examination</td>
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<tr>
<td>3 Patient Investigation</td>
<td>Written Examination; OSCE; Observations Portfolios</td>
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<td>4 Patient Management</td>
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<td>5 Health Promotion and Disease Prevention</td>
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<td>8 Principles of Social, and Clinical Skills</td>
<td>Basic Written Examination; Portfolios; Observation; OSCE</td>
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<td>Observation; Portfolio; OSCE; Peer/Self-Assessment; Written Examination</td>
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<td>10 Decision Making; Clinical Reasoning and Judgement</td>
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<td>11 Role as a Professional</td>
<td>Observation; Peer/Self-Assessment; Portfolio; OSCE; Written Assessment</td>
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<tr>
<td>12 Personal Development</td>
<td>Portfolio; Observation; Peer/Self-Assessment; OSCE; Written Assessment</td>
</tr>
</tbody>
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**Discussion and Conclusions**

Engagement with the assessment process and ensuring that students achieve the required learning outcomes is an important role of a medical teacher. This guide emphasises the move from assessing knowledge and technical competence to more complex learning outcomes such as attitudes, team work and professionalism. How the different assessment instruments fit complement one another in the assessment
of the required competencies is as important as understanding the details of each. What is required is a focus on the construction of test blueprints to adequately sample the learning outcomes to be assessed. Qualitative assessment approaches have been underused in medical education and have been associated wrongly with subjective assessment. Three principles apply in the use of qualitative assessment: triangulation, frequent and continuous assessment, and training of the evaluators. An indication of a student’s strength and weakness across all competencies is the ultimate goal. This can be presented as a profile for a student which shows their levels of attainment for each of the competencies.

In response to increasing public demands for a greater measure of accountability for the physicians we educate, rapid progress needs to be made in designing competency-based curricula and assessing students in increasingly realistic ways to show they can practise medicine. This model of assessment of learning outcomes needs to be applied across the different phases of education from undergraduate medical education to postgraduate education and continuing professional development.

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