

## **Toward more objective teaching Assessment of medical student**

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### **Introduction:**

Assessment of medical student perhaps the most critical of all tasks facing the teacher.

The assessment used supposed to measure what we are supposed to measure in as far as & as accurate way as possible.

### **The aim of assessment:**

There are a considerable of diversity of opinion and assessment aims, some may see it as testing the student mastering of the course content, others may see it as a way of ranking the student, others as a way of encouraging the students to study the course to sum up of all aims:

- 1- Measure the essential skills & knowledge
- 2- Measure improvement
- 3- Ranking student
- 4- Find out student difficulties
- 5- Evaluate the teaching method
- 6- Evaluate the effectiveness of the course
- 7- Encourage student to study
- 8- Certification for practice

During the last year impressive advance has been made in student evaluation & fundamental requirements are defined to make the evaluation & grading system more valid, reliable & discriminative, there is however growing realization that the examination technique are devised to motivate & stimulate learning to grade students more reliably, & these methods permit reliable comparison to the academic attainment of students not only in the faculty but also in different schools as well as in the international level.

### **What makes a good assessment?**

To answer this question:

- 1- Does the exam comply with the regulation for the course
- 2- Is the assessment reasonably economic & feasible
- 3- Does the assessment test the important skills & abilities are valid
- 4- Does the assessment give information that will help the student to learn better & help to improve teaching
- 5- Are the mark gained by each student are accurate & reliable.

So the criteria of assessment techniques are:

- 1- Objectivity: any technique for measuring medical competence must yield objective data, an examination is objective when for examples different examiners independently arrive as closely similar grades for each of series of exams.
- 2- Validity: any exam instrument used must be valid for the task it is to do

The exam should measure what is supposed to measure, so a particular exam might be valid for one purpose but invalid for another.

**The measurement of validity includes:**

1. Content validity
2. Predictive validity
3. Concurrent validity
4. Construct validity
5. Team validity

Content validity means the extent to which a test or exam actually measure the introduced content answer to achieve it & the aim, the exam should have the following criteria:

1. To define the subject matter being assessed.
2. Identify the cognitive, behavioral attitudinal process involved.

**Content validity** is based on expert judgment and the assessment should compare what is taught and what is measured.

Concurrent validity means the degree to which scores on a test correlate with the score on an established test administered at the same time

The aim is to:

1. Administer the new test
2. Administer the establish test
3. Correlate the two sets of scores
4. The greater the positive correlation the greater validity

Predictive validity of exam to predict future performance, it is of greater value in selecting purposes, the procedure it include:

- a. Administration of the test
- b. Collect measures of the new behavior
- c. Correlate the two results
- d. The magnitude of the correlation coefficient will define the predicted validity

**Construct validity** is to measure the extent to which a test measure a hypothetical construct for example intelligence

Factors affect validity:

1. Vague or miss leading instruction to candidates
2. Overcomplicated wording.
3. Too few test items causes poor scaling validity
4. Problems of time
5. Items difficulty too easy or difficulty will fail to discriminate.

**Reliability** ,exam consider to be reliable if they yield stable or consistent scores when given repeatedly to the same student under similar conditions.

The more reliable the exam the greater the confidence that the results would be the same if the exam where re-administer.

Factors affect reliability

1. Test length :the more items included in an exam, the greater the reliability
2. Objectivity in scoring ,long assay questions reduce the reliability
3. Environmental errors :end of the day
4. Processing error, mistakes are made in calculating candidate marks.
5. Classifications errors

6. Generalization error, an exam may generalize for specific answer.
7. Bias error.

### **Feasibility**

Examination instruments should be feasible and calculate the core of the following parts has to be considered

1. The time consumed to construct the test
2. Time of marking
3. Organization
4. Feedback feasibility

### **Methods of assessments**

1. Summative assessment usually undertaken at the end of the course the student usually receives a grade or a mark, good summative exam should involve the analysis of many course

In any form of summative exam, it is important that every aspect of a curriculum which is considered essential to be included and the advantages of summative assessment are:

1. Obtaining a university degree
  2. A guide to continue with their program of study.
  3. Evaluation of any institute
  4. Certification of competence
  5. Assessment of program
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2. Formative assessment :designed to give feedback to the student as they go along and student should know what is require of them and the learning environment should promote opportunities that permit the application of their knowledge, skill and attitude

This exam must be built into the course work in a relevant and non-threatening fashion  
This type of assessment can be used in

1. Observing practical and clinical work
2. Upraising projects
3. Evaluating small group discussions

This type of assessment is effective of proving competencies and it is important for feedback and the importance of feedback that informs student about how they are performing in relation to the learning this feedback can be achieved in

1. End of the course
2. During informed discussion between trainer and trainee

And the feedback should concentrate on both the good aspects of the performance and the not so good.

Feedback from teachers should concentrate on improving learning and students should experience a gain in motivation

A good feedback will be of great value to students and should have the following criteria

1. Feedback is best given immediately after the response to learning if possible
2. Feedback should be specific rather than general response this insure that the student knows exactly what was appropriate
3. To be accurate appraisal in learning situations
4. Not embarrassing that's to say to avoid personalizing the feedback and focus on specific behavior rather than on individual responsible

5. Constructive be frequent and regular :the student sees it as something positive and beneficial.
6. Provide relevant Information and guide line on how to improve the performance

**Self Assessment:**

This is a key way of developing in students, an appreciation of what quality in performance.

The students realize that the learning process is not imposed on them and that there self assessment is not a replacement for other forms, and this type of assessment create a good rapport between staff and student, self assessment means monitoring the progress and deepening the learning process.

The self assessment techniques can be MCQ's , OSCE or rating scales can be used by students to gauge their progress.

Norm referenced and criterion referenced assessment:

- 1- In norm referenced is where the assessment describes the student's performance in terms of the student's position in the class.

It doesn't give:

A: accurate representation of what students can and cannot.

B: useful feedback

It is essential in ranking the students in class

- 2- In criterion referenced is used to determine whether a student has achieved mastering in a particular skill or knowledge

In carrying this type it is important to establish the following behavioral

**objectives:**

There is a clear definition that what the student should know or be able to do

A standard which indicates an acceptable level of performance

This can be range from complete mastering of a task to the minimum acceptable level

**Methods of assessment used in medical college:**

These methods should measure the performance of student as well as to be used as feedback mechanism for the following:

- 1: a measure of the level of student performance
- 2: an indication of the effectiveness of the teaching situation
- 3: a measure of the appropriateness of the student input

Types of exam:

1: short answer items

2: MCQ

3: matching exercises

4: constructed response questions

5: tutor reports

6: dissertation

7: objective clinical exam

8: oral exam

9: essay: Purpose to permit the examinee to give in writing and in his own words a relatively free and extended remark on the student

**Short answer questions:**

By this question allow teacher to ask questions about a large proportion of a course and to mark more accurately and quickly because they are so much more specific than essay. They are quicker to make and more reliable. The main disadvantage of this method is that it may test the student abilities to remember facts rather than apply knowledge or use skills.

MCQ (multiple choice questions):

Advantages:

A: they sample a wide range of learning outcomes in a short period of time.

B: it is relatively easy to answer than the questions

C: the probability for guessing the correct answer is quite low

D: can be marked very quickly and accurately

Disadvantages:

A: it is quite difficult to write a clear question

B: it is time consuming to write and usually they are usually test the student knowledge

C: only rarely do they test decision making skills and cannot test the student ability to communicate or to perform procedures

Matching exercise:

Students asked to match pairs of items from a list of responses. It is important that clear instructions are given to avoid any inconsistencies or ambiguities relating to the nature of the task in multiple matching type the student has to make the right connection from two or more lists

Advantages:

1. Relatively easy to construct

2. Appropriate for measuring associations

3. Guessing the correct match is not so simple

4. Can cover a number of associations with one exercise

Disadvantages:

1. There is tendency to focus on basic information

2. It is opened to irrelevant clues

Constructed response questions:

These questions require the student to generate and answer rather than select from a small set of options.

The question may be asked in a variety of formats and generating the answer involves the student in carrying out an intellectual physical task.

This type of question may be either:

1. A written question

2. A statement/report

3. A problem scenario

4. A photographic or other visual material

5. A test result or investigation data

The response generated by the student may be:

1. A very short answer or several words

2. Short answer

3. Long answer

4. Physical task: a project or other complex performance such as cardiopulmonary resuscitation or conducting an investigation

**Advantages:**

1. It is used to assess important curriculum outcomes and to drive the learning approach of students
2. It can assess not only student knowledge but also has to apply knowledge to interpretation of data, problem solving which are important outcomes of medical education
3. Simulation of important or common clinical situation are possible with this type of questions and increase the reality
4. It is easy to construct

**Disadvantages:**

1. It needs some expertise to avoid ambiguity
2. It needs content expert to make the paper.
3. Sometimes it needs double marking to achieve the required level of reliability

**Tutor report:**

Clinician may be asked to provide reports on students or doctors who are attached to their units for a period of time. These reports are best provided in a structured format based on an assessment of student performance in a specific area during the attachment period. These reports designed to rate the student performance over a range of competencies or curriculum outcome.

**Advantages:**

- 1.it assess the personal attribute
2. attitude
3. generic competencies
4. professional values e.g reliability and trust worthiness, ability to work

**Disadvantages:**

1. Problem in the use of rating scales
2. Subjectivity
3. Low reliability
4. Adverse influence on the relation between tutor and student

Several measures have been advised to improve the quality of tutor reports

It is important to maintain a pressure on tutors that the reports are taken seriously and that adequate attention is paid to their completion

**Training of tutors on using rating scales**

Using increasing numbers of people who contribute to the report and taking into consideration the views of several tutors and other members of the health care team working with the student will increase its objectivity. Anyway tutor report is not good way to test knowledge.

The report should include a member and areas some of which are difficult to assess by other means

1. Relationship with patients
2. Attendance
3. Interest and motivation
4. Reliability

5. Clinical skills
6. Appearance

### **Dissertation**

It is a written work based on personal research, the research maybe either literature, review, and a piece of original work or bot.

These might include:

- a. Questionnaire survey
- b. Interview survey
- c. Binary reviews
- d. Practical research
- e. Audit projects
- f. Case note survey

The outcome of the research might be presented by the individual student or by the group as a report, a poster, a video tape or audio tape, short computer program, oral presentation or written material.

These projects and dissertation are used for assessment purposes at both under- and postgraduate levels.

Advantages:

Can be used to assess a range of curriculum outcomes, they can provide evidence of creativity through the way that the student present their results. Students can acquire a range of competencies.

1. Knowledge of specific types
2. Improved communication skills through interview surveys
3. Competence in practical procedures
4. Accuracy in dealing with data
5. Improved critical thinking
6. Problem solving skills

Disadvantages:

1. Experienced supervisors are necessary
2. Need resources and finance and adequate funds
3. Fraud and plagiarism are potential problems

How to assess the types of tests using rating skills, particularly where a number of people are involved in assessing the project or dissertation.

### **Objective clinical examination:**

This type of assessment will cover all domains, knowledge, skill, and attitude used in clinical areas in which a variety of test methods can be incorporated especially to test a wide range of skills in an objective way.

The student rotate through a series of stations and undertake a variety of tasks.

Marking sheets and checking lists are prepared before and to improve the reliability of the scoring, so all students are examined on the same context and marked on the same criteria and by the same examiner.

For the main problems with the traditional clinical examination ( long and short cases ) is that they all too often test very limited content areas and seldom measure much beyond factual recall and a few basic skills, as well as the disadvantages that students subjected by different examiners being too slow, using different standards made the exam rating lacking reliability and fairness.

This type of examination, if well planned will allow a wide variety of attributes to be tested including skills e. g. physical examination, procedures. Data interpretation and attitudes using real patients standardized (simulated) patients

Written short structured vivas, simulations, X-rays.

Though complex to perform in the beginning but in due course with developing a bank of reusable OSCE stations make later examinations decreasingly easier.

### **Oral examination:**

By this exam the student is presented through his answer to questions put to him orally to demonstrate his knowledge and understanding in his subject of study, as well as, his thinking and problem solving ability.

Advantages:

1. Direct personal contact with the candidate
2. Opportunities to take into account mitigating circumstances
3. Flexibility in moving from strong to weak area
4. Opportunity to ask the candidate how he arrived at an answer
5. Opportunity for simultaneous assessment by two examiners

Disadvantages:

1. Inadequate standardization
2. Insufficient objectivity and reproductively of results
3. Possible abuse of personal contact with the examiner and probable cueing
4. Undue influence of irrelevant factors
5. Few trained examiners available
6. Excessive cost in professional time in relation to the limited value of information obtained

### **Assay:**

Assay examination have become quite rare in medical school for several reasons.

1. The main cause is unreliable marking
2. Student cannot know what information the examiner consider to be important
3. Take long time to mark
4. The students are unlikely to learn very much from the test

To improve the reliability of assay type of examination is to prepare a marking scheme and follow it (checklist) which list the major point that should be covered in the assay

### **Short answered questions:**

The rules of constructing short answered questions are:

1. Must be brief and reasonably answered
2. Avoid ambiguity related to phrasing.
3. Avoid if possible wording taken directly from textbooks.
4. Direct question is preferred to an incomplete statement.

Often ask student to give example, write down some advantages or draw a diagram. They are much more specific than assay, are quicker to mark, more reliable, and are much quicker to answer. The main disadvantage of the test is that it is not ideal in assessing complex learning outcomes.



**Conclusions:**

These are the main methods and modalities of assessment and no assessment method is perfect. Each has some advantages and disadvantages. We should therefore use a variety of methods whenever possible

Ideally one should first decide what skills need to be assessed

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