

Multiple Choice Questions



Overview

- Why are MCQs used for assessment?
- How useful are they as assessment tools?
- How are MCQs constructed?
- What are the pros/cons of MCQs?
- Tips for constructing MCQs

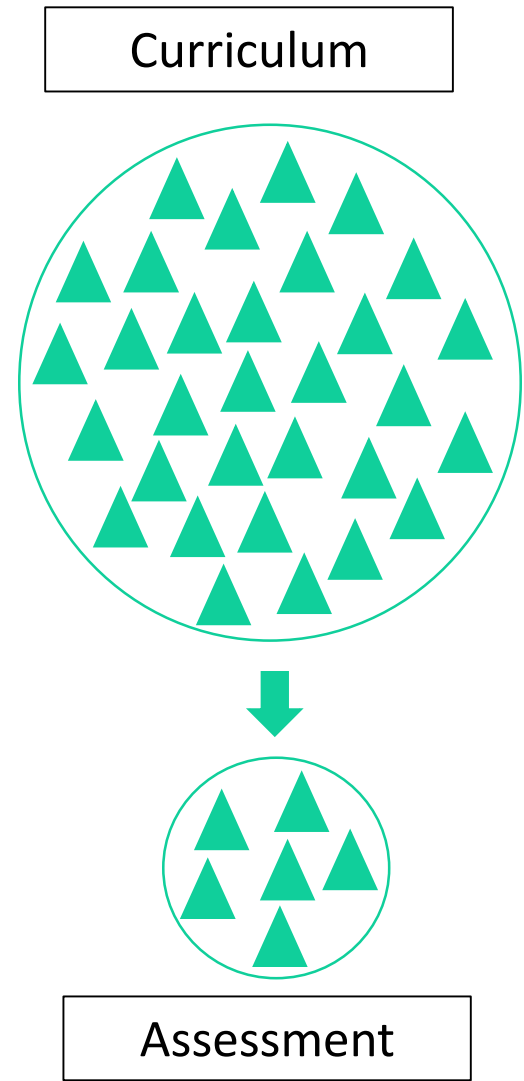
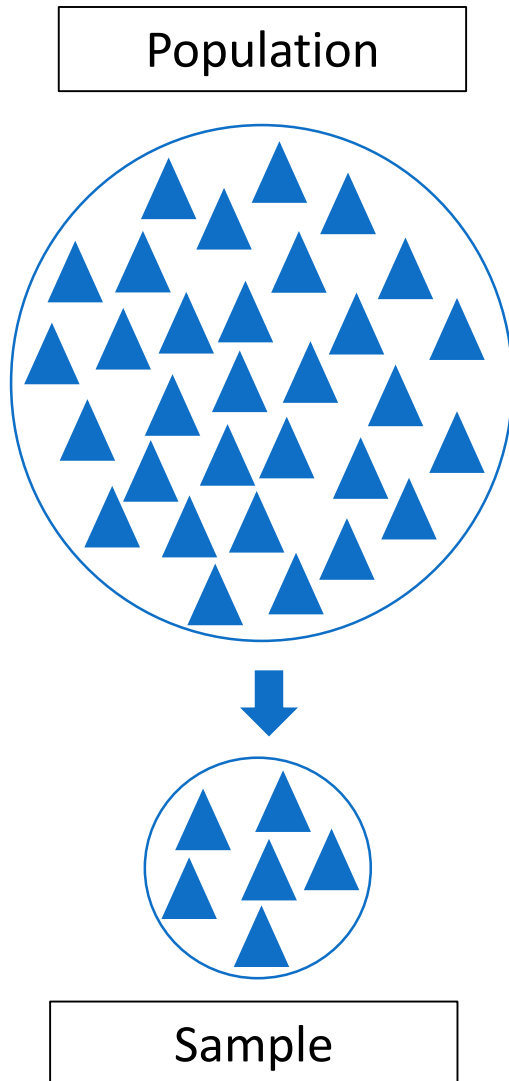
Assessments...

- Assessment content should represent the curriculum
- Ideally the entire curriculum should be assessed



NOT PRACTICAL

Content sampling



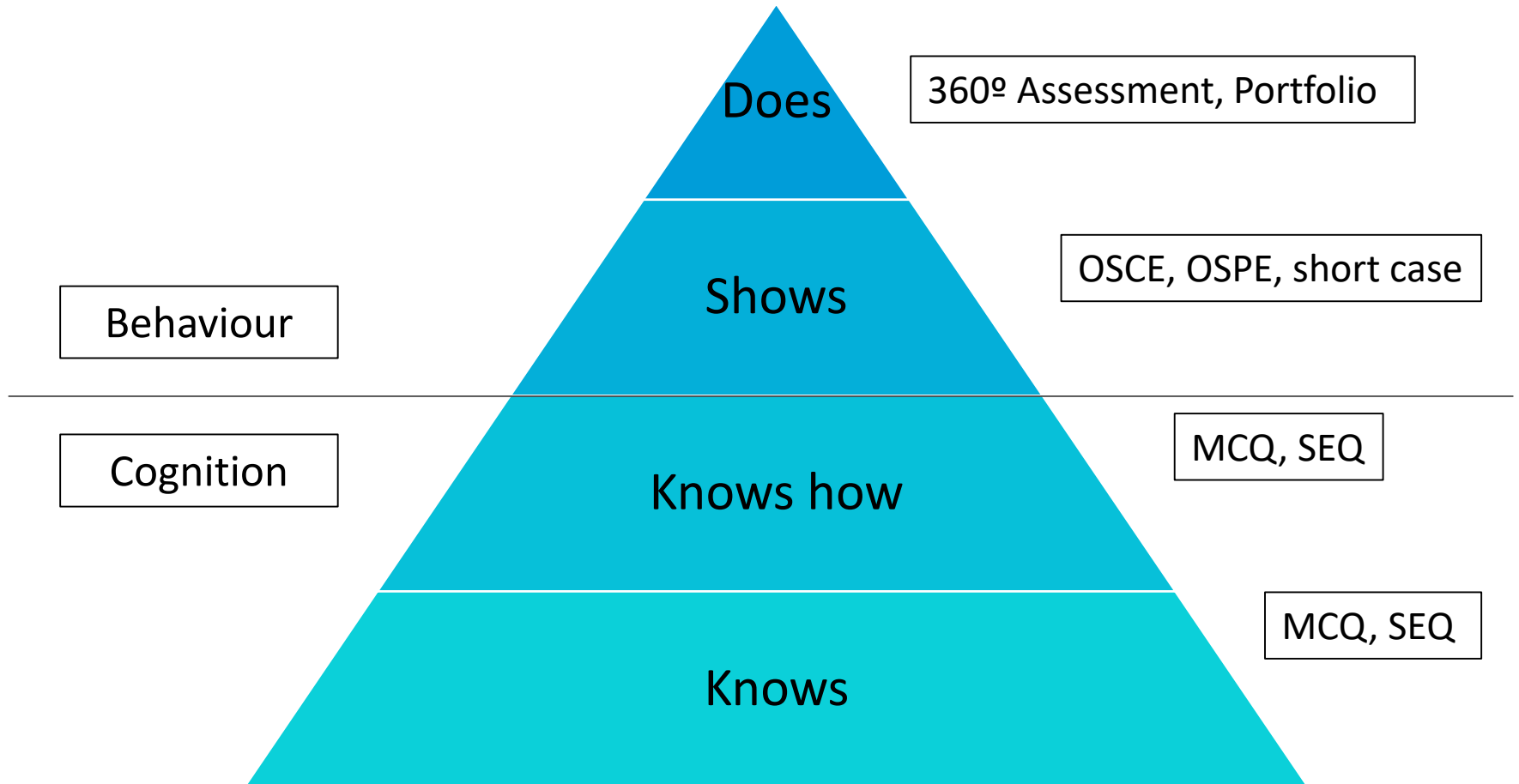
Assessing curricular content

- Content to be assessed: blood pressure measurement
- Learning outcome: be able to correctly perform blood pressure measurement
- Assessment method: SEQ – Write a short note on blood pressure measurement



What is the problem here?

Miller's Pyramid



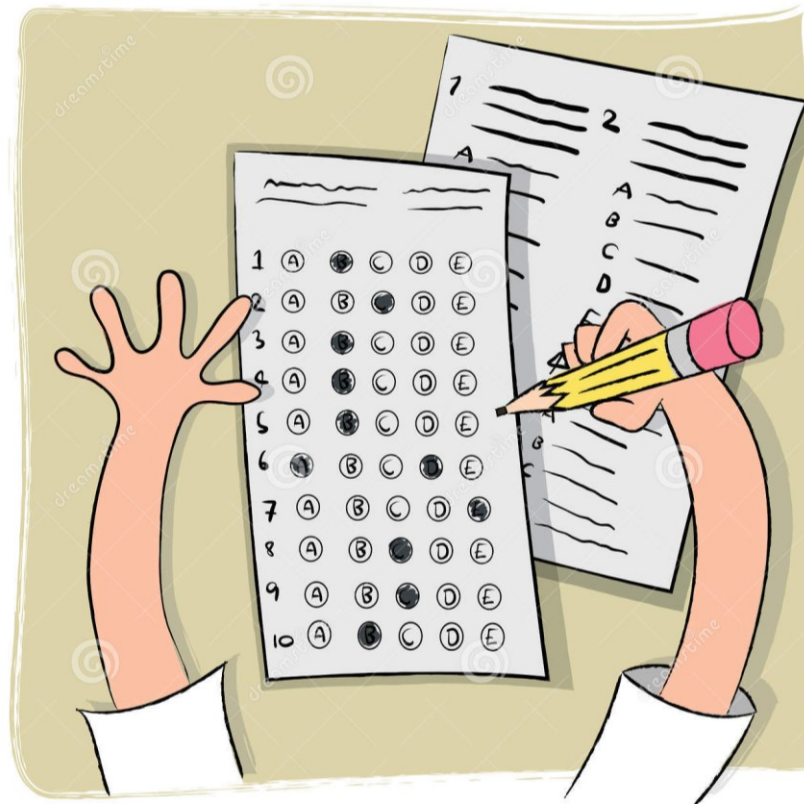
Why are MCQs commonly used?

- Valid – broad sample of content
- Reliable – objective scoring: reproducible
- Feasible (ease of administration)
- Cost-effective (greater coverage of content per unit of testing time)
- Can be constructed with relative ease (especially recall type questions)

Pitfalls

- Higher chance of guessing
- Mainly tests factual recall
- Negative marking
- Though a candidate may correctly answer a “false” item, it does not mean that he/she knows the correct answer

The 'testwise' student!



A Mock MCQ Paper

Question 1

Stergomeba is an

- a. Hetropote
- b. Norgocyte
- c. Optropin
- d. Stermaca
- e. Ablowa

Question 2

Acetabulosis is

- a. Always found among antrogores
- b. Seen with Stipogyes
- c. Usually leads to atropyoma
- d. A benign condition
- e. Never a cause of btrodetitis

Question 3

A patient was diagnosed as having Balatititis. What is the most appropriate plan of management?

- a. Conservative
- b. Exercise
- c. Dietary control
- d. Treament with activated nortrol followed by brangotherapy
- e. Drugs

Question 4

A 50 year old women is diagnosed to have menitritis. The most appropriate combination/s of drug treatment for her condition is/are

- a. Antropin and Bactipan
- b. Bactipan and Salmetin
- c. Antropin and Dectin
- d. Bactipan and Dectin
- e. Dectin and Salmetin

Question 5

What are the symptoms of a second episode of infection?

- a. Fever
- b. Cough
- c. Fatigue
- d. Loss of appetite
- e. All of the above

T/F MCQs

- Format
 - Stem (statement)
 - Items (responses)

.....
.....?

- a.
- b.
- c.
- d.
- e.

Tips for construction: Stem

- Avoid open statements. Always phrase the stem as a question.
- Avoid grammatical cues
- Avoid negative statements
 - “Each of the following is correct except...”

Tips on construction: Responses

- All options should be of equal length

eg.: A. Digoxin
 B. Lidocaine
 C. Phenytoin
 D. Propranolol
 E. Quinidine

- List in a logical order (numerically or alphabetically)
- Equal balance of true and false responses

Tips on construction: Responses

- Vary the order of T/F responses
- Avoid always having a true statement as the first response
- Avoid: 'all of the above', 'none of the above' responses
- Avoid using ambiguous terms – sometimes, frequently, rarely, usually
- Avoid absolute terms – never, always

Testing recall

What are the causes of sinus tachycardia?

- a) thyrotoxicosis
- b) propranolol therapy
- c) anxiety
- d) exercise
- e) sleep

Testing application

A 45 year old woman with increasing “tiredness” and difficulty in swallowing has the following haematological indices

Hb 8.5 g/dl (14 +/- 2.0)

MCHC 29 g/dl (33 +/-2.0)

MCV 80fL (85 +/-8.0)

ESR 10mm (0-7)

True/false regarding this patient?

- a) Multiple myeloma is a likely diagnosis
- b) Koilonychia would be an expected finding
- c) Serum TIBC is likely to be increased
- d) Bone marrow aspiration biopsy is clearly indicated

Single Best Response

- Format
 - Stem: clinical scenario, patient description, clinical findings
 - Lead-in question
 - A series of response options

SBR Outline

1. -----

-----?

A.....

B.....

C.....

D.....

E.....

Tips on construction: The stem

- Usually a clinical case commonly encountered in day to day practice
- Not necessary for factual recall questions

Tips on construction: Lead-in

- Should clearly indicate how to answer the question
- Cover test

Tips on construction: Responses

- Only one clearly correct answer for the informed candidate.
- The distractors should be equally plausible to a weak candidate.
- When 'the best' or 'the most likely' answer is sought this should be clearly stated in the lead-in.

Example 1

A patient with a history of ischaemic heart disease is complaining of central chest pain following laparoscopic cholecystectomy. A 12-lead ECG shows ST elevation in leads II, III and aVF.

Which coronary artery is most likely to have been occluded?

- a. Left anterior descending artery
- b. Left circumflex artery
- c. Left coronary artery
- d. Posterior interventricular artery
- e. Right coronary artery

Example 2

From the list below, which of the following carcinomas of the lung is highly associated with exposure to asbestos?

- a. Adenocarcinoma
- b. Malignant mesothelioma
- c. Large cell carcinoma
- d. Small cell carcinoma
- e. Squamous cell carcinoma

General tips for constructing MCQs

- Questions should be clear and unambiguous
- Avoid taking statements directly from text books/lecture notes
- Align questions to learning outcomes - in terms of content and cognitive level
- Include questions enabling higher order thinking, not only recall type questions
- Include questions with clinical relevance

“MCQs which are well constructed assess taxonomically higher-order cognitive processing such as interpretation, synthesis and application of knowledge rather than testing recall of isolated facts”

Case, S.M., Swanson, D.B. & Becker, D.F. (1996) Verbosity, window dressing and red herrings: do they make a better test item?, Academic Medicine, 71, pp. S28–S30.

General tips for constructing MCQs

- Create an acceptable balance of different levels of difficulty
- Ensure that items are psychometrically robust:
 - Difficulty index
 - Discrimination index

Difficulty Index

- Indication of the level of difficulty of the item
- Proportion of students who correctly answered the question

$$\text{Difficulty Index} = \frac{\text{Number of students who answered the question correctly}}{\text{Total number of responses}}$$

- Between 0.3– 0.8 (0.5– 0.75 for T/F questions)

Discrimination Index

- How well the item can discriminate between good and weak students
- Student group divided into 3 groups based on overall test score (upper and lower 27% and middle 46%)

Correct answers in upper 27% - Correct answers in lower 27%

27% of total number of responses

Discrimination Index

- Between -1.00 to $+1.00$.
- Acceptable >0.3 . Higher the better.
- Items with negative values must be revised or removed