student BMJ 2000;08:347-394 October ISSN 0966-6494

Mastering exam technique

Peter Cantillon gives some tips on dealing with MCQs and SAQs

The multiple choice questionnaire (MCQ) has become one of the standard assessment methods in most medical schools over the past 30 years. MCQs were developed to address problems associated with traditional essay style testing. They are seen as a more objective test of students' knowledge than essays. This is because essays are marked by individuals who interpret a student's response against a standard answer format. So there is inevitably an element of personal judgment or subjectivity about such a marking scheme. MCQs, on the other hand, should have clear right and wrong answers and so should be free of any interpretation bias. They are generally regarded as being reliable and thus consistent and valid tests of students' knowledge and information recall.

MCQs have many advantages for teachers. Once designed they are easy to administer and mark. Most MCQs are answered on a card, which can be read by a computer coupled with an optical card reader. So the whole process can be automated leaving teachers free to do other things. The scoring is done by the computer, which also reports on the reliability and discriminatory power of the MCQ questions. The crude unadjusted results are available quickly and can be given to examiners who are in the process of judging pass or fail and honours performance. So it seems that the MCQ is an assessment design that you are likely to encounter many times during your undergraduate and postgraduate career.

It is important to note, however, what MCQs cannot do. They cannot measure clinical performance or competence. They can occasionally be used to test components of diagnostic reasoning and problem solving.

They are usually combined with other test formats that test different aspects of candidates' performance - for example, objective structured clinical examinations, short answer questions, etc. MCQs have also been criticised for providing candidates with visual "cues" that suggest a correct answer, one which the candidate might not otherwise have recalled.

Marking schemes

There are two types of marking commonly encountered in MCQs. These are "negative marking" where marks are deducted for incorrect answers and "neutral marking" where all questions should be attempted - marks are given for correct answers only and guessing is encouraged. Negative marking was introduced to reduce the amount of guessing by candidates by "punishing" incorrect responses with a negative mark. There are several different MCQ formats that may be encountered in medical school examinations, the commonest of which is the true/false design (see box 1).

Box 1: True/false design

In a 67 year old man with mild hypertension, first line antihypertensive treatment would usually be started with:

Clonidine	TFDK
Atenolol	TFDK
Bendrofluazide	TFDK
Methyldopa	TFDK
Amiloride	TFDK

The question begins with a stem or question and then poses five solutions. Each solution may be true or false. Some examinations also offer the candidate a DK (don't know) option.

An alternative design (simple multiple choice) is where only one of the solutions is the correct answer (see box 2); the other four are designed to distract you and are in fact called "distractors." This design reduces the likelihood of success in guessing. In a standard true/false design you have a 50% chance of being right if you guess, whereas this method means you have only a 20% chance of guessing the right answer.

Box 2: Simple mutliple choice

The drug of first choice for the management of hypertension in a patient with diabetes who is insulin dependent with no pre-existing renal or cardiovascular disease is:

Bendrofluazide	TF
Atenolol	TF
Clonidine	TF
Frusemide	TF
Enalapril	TF

An angiotensin converting enzyme inhibitor would be regarded as the drug of first choice from this list; the other drug options act as distractors.

The stem at the top of an MCQ question can take many forms. It may be a statement or question. It could also be a brief case description, a set of results, an electrocardiogram strip, or even a photograph.

A common MCQ format used in the United States, which is beginning to be used elsewhere, is the "extended matching" design. This purports to allow testing of higher level functions such as diagnostic skills. The candidate is offered a long list of answers and has to match them to a short list of clinical problems or scenarios.

MCQ tips

Preparation
Try to gather as many examples as you can of old papers and previous examples of MCQs used by the department or school in question in the past.

Do not, however, try to memorise hundreds of responses to questions. The factual knowledge you will gain will be superficial and dissociated. It is better to look for the topic areas that recur frequently and ensure that you have a deeper knowledge of these topics.

Revise with friends and colleagues. You can share knowledge and techniques. Familiarise yourself with the optical reader cards that you will be using to record your answers in the exam. Examples should be available from the "examinations office."

You should know what type of MCQ is being set for you. Will there be negative marking? How much time will you have and how many questions will there be?

On the day
Check that your understanding of the MCQ format is correct. "It is negative marking, there are 300 questions, and I have two hours to complete this." Always read the stem for each question carefully. Have you understood the question? Are there any ambiguities? If so ask an invigilator who will alert an examiner. There are usually one or two in the room. Allocate three quarters of the time to answering the questions and a period at the end to checking answers and accuracy.

If the MCQ is a true/false negative marking design start by answering questions for which you are certain of the correct answer(s). Mark the questions where you may know the answer but need to think a little. When you have completed your "certains" then look at the questions about which you are less certain. Answer as many of these as you can. It is generally advised that you do not guess in situations where you "haven't a clue." The half and half rule applies both ways. You may improve your position; you could also worsen it considerably.

If the MCQ has a "neutral" marking design you should answer all questions. You will not be penalised for guessing, so have a go. You cannot score if you leave answers blank.

Essay and short answer question assessments

Essay tests were for many years the standard written assessment in medical schools throughout the world. They have lost favour in recent times and have been replaced by newer formats such as short answer questions (SAQs), multiple choice questions (MCQs), and modified essay questions (MEQs). From a teacher's point of view essays are easy to set but are notoriously time consuming to mark. It is also difficult to achieve reliable marking between different sets of examiners marking the same papers.

The standards of assessment expected of medical schools are now high, so unreliable and time consuming assessments are being phased out. Having said that, the essay has an important place in the constellation of assessment methods. It is a useful method for assessing students' capacity for analytic thinking and their ability to present their ideas coherently (and legibly). Essays can also be used to assess students' attitudes and their aptitude for looking at a problem from different angles.

Essays may take several different forms. The commonest styles are extended response and restricted response. The extended response question tests the depth of the students' knowledge and their ability to organise and present their thoughts. The restricted type is used to test the ability to recall knowledge related to a particular topic.

These are two examples.

Describe the community based services that you believe ought to be provided to patients after a stroke. Support your answers by providing evidence of effectiveness for each intervention. (Extended response essay question)

A 76 year old woman presents with a mass in her right breast. A biopsy confirms cancer. Present your plans for investigation and management. (Restricted response essay question)

Essay tips

Preparation
Try to acquire past papers from the examining department. You may also be able to get papers from students in the years ahead of you. There are books of essay questions available.

Work with friends and colleagues to plan answers to questions. Share knowledge and techniques Predicting likely essays is a risky business. It is reasonable, however, to try to

identify what you (and the examiners) think are the areas of core knowledge for the essay examination. Check your estimation of key areas with friends and colleagues. You can then devote more time to acquiring a fuller understanding of those core areas while maintaining a strategic knowledge of other apparently peripheral topics. You cannot know it all so you do have to choose where to target most of your efforts.

Doing the essay

Check how much time you have to do the question(s) that have been set for you. Plan an equal amount of time for each question. Be disciplined. Do not be tempted to spend more time on one question than another. You will get no marks for an unanswered question no matter how brilliant the answer to the preceding question.

It is usually advisable to allocate time for preparing a framework of how you intend answering the question before you start to formally write your answer.

Leave time at the end (15 minutes?) to reread and correct your answers.

If you are feeling uninspired try using surgical and medical sieves to come up with differential diagnoses and other relevant themes. Use categories such as acute and chronic to suggest new ideas. Another useful technique is to organise your essay along the lines of a standard clinical examination - for example, history, examination, investigations, treatment, etc.

Short answer questions

Short answer questions (SAQs) were designed to address some of the major criticisms of essay style questions. An SAQ is designed to sample a student's knowledge covering a greater proportion of the content of a course or curriculum than is possible with in essay. It is also easier to achieve reliable (consistent) marking between different examiners (using standard answers and marking schedules) than is possible with essay style questions. The duration of the examination is often similar to that of an essay style question, but in place of one or two essay questions there are several questions to which short focused answers are expected. It is possible to structure the answers in sequential points rather than a more discursive essay style (see example below). The candidate is usually presented with a brief clinical scenario followed by a series of related questions. The marks for answers to each question are usually clearly indicated.

An alternative to the standard SAQ that you may encounter is the modified essay question (MEQ). The MEQ was designed to test problem solving and decision making ability. The MEQ format usually involves a case history that is sequentially revealed to the candidate. An MEQ is usually introduced with a brief case scenario followed by a short answer style question. Having completed the first question the candidate turns to section two of the problem where a supplementary question is posed with or without further clinical information and so on.

Example of an SAQ

A 67 year old woman presents to her GP after several recent episodes of haemoptysis. She has had a cough for three months and has lost 6 kg in weight. She has smoked heavily from the age of 16 years.

Question 1: What is her most likely diagnosis?
Question 2: List three investigations to confirm the diagnosis.
Question 3: List the therapeutic options for the different tumour types.

SAQ tips

As with all written examinations it is important to try to collect past papers. The best preparation is to practise the SAQ format with friends and assess each other's performance.

Get to know how different marks are allocated for each section within a question. Try timing yourself doing a past test. See whether you are able to distribute your time effectively between the questions. Once again you must plan to be disciplined about devoting equal time to questions. You can spend more time on subsets of questions that yield more marks, but the overall time allocated per question should reflect the marks the question is worth. If all questions are scored the same then the time spent on each question should reflect that.

During the examination

Read through the paper briefly to acquaint yourself with the task ahead.

Note how marks are allocated. If all questions have equal weighting in terms of marks, allocate time evenly. If, on the other hand, marks are allocated differentially between questions then devote more time to questions that yield more marks.

Try using a short point format rather than a long hand style. It saves time.

Recommended reading

Bullimore D. Study skills and tomorrow's doctors. London: WB Saunders, 1998.
The PASTEST series includes useful books giving examples of OSCEs, MCQs, and SAQs. There is little attention, however, to understanding how the assessment works or to exam technique.

Peter Cantillon, *assistant postgraduate dean*, Guy's, King's, and St Thomas's School of Medicine