

Creating Good Self-Test Questions

The great strength of self-test quizzes is that learners get **immediate feedback** to help them **identify and correct misconceptions** as soon as possible. They can also help learners identify when they need to spend more time on material. And they save educators time by not having to mark individuals' responses.

However, writing good questions that really test or prompt learning requires some thought. It's easy to slip into questions that can be answered just by intelligent guesswork.

This guide offers tips on:

1. Deciding what questions to ask
2. Writing effective multiple choice questions
3. Checking for accuracy

Deciding on content

Start by listing the topics you want to check learners understand:

- What were the key take-aways that all learners should know after completing your program?
- Or what do you want to check they understand before they start?
- What are the typical mistakes or misconceptions that people have in this area?

Choosing the question type

True/False – it's best to avoid these because there's a 50% chance of guessing correctly, and it can be difficult to write statements that are unambiguously true or false.

Multiple choice – requires learners to select one *or more* correct answer from a list. They can be used for quick, simple fact-checking or for more challenging tests of how well learners can apply their understanding, e.g. by presenting a scenario or some data/charts that learners need to interpret.

Matching questions are a type of multiple choice question where a set of questions share the same set of answer choices.

Drag and drop – requires learners to choose from a set of labels/items and drag them to the correct part of a diagram. It can be used to test whether learners can:

- recognise anatomical structures
- identify important elements in a chart or X-ray
- categorise items correctly (by dragging words/images to the correct category box or table cell)
- place a set of events or procedural steps in the correct order

Calculations – Moodle allows you to construct 'numerical' questions where the answer can be specified as accurate if it falls within a given range, and the units can be marked separately.

Short answer question (SAQ) – there are two ways of using these in a self-test quiz:

- (a) Create a question with a single correct answer of just one word or term – responses will only be marked correct if learners give the exact wording and spelling.
- (b) Ask an open question. Don't try to mark the response, but give a ideal response in the feedback.

Essay questions allow longer responses to open questions, sometimes including links/attachments.

Self-test questions generally rely on learners **recognising** the correct answer, and will provide them with an immediate 'score' and, ideally, some feedback explaining *why* their answer choice was correct/incorrect.

However, the best test of understanding is whether learners can **recall** facts or express ideas in their own words; this process also helps learners remember the material better. Consider including some open questions, perhaps in a separate quiz/assessment, where learners are awarded *completion* marks. Immediate feedback is still possible via example answers.

Writing multiple choice questions

It's easier to start with a few examples of common mistakes to avoid when writing multiple choice questions. See [Cathy Moore's quiz](#) for some light-hearted examples.

There are two typical problems to avoid:

1. Writing questions that allow savvy learners to *guess* the correct answer.
2. Writing questions that *confuse* learners into picking the wrong answer.

Avoiding savvy guesses

Try this imaginative [example from UWE](#) to see how well you can do on a topic you know nothing about!

Even when learners don't understand the topic well, they might improve their score by:

- choosing the **longest answer**
- choosing the most **carefully-worded answer**, including qualifications such as 'generally' or 'usually', and **avoiding absolutes** such as 'always', 'never'.
- choosing 'all of the above' or 'none of the above'
- looking for **grammatical cues**, e.g. a question ending with 'an' suggests that the correct answer starts with a vowel.
- looking for **repeated words or information** - choosing the answer with the most elements in common with the other answers.

Avoiding confusing questions

- Don't try to cover too much in one question.
- Avoid long, complicated answers.
- Avoid negatives, or make them very clear, e.g. "Which of the following is NOT an example of X."
- Be consistent in how you express numbers, including proportions (i.e. half or 50%)
- Be careful how you express frequency. People can interpret 'usually', 'often', 'occasionally', 'likely', 'commonly', 'rarely' etc. in very different ways.

Other general advice

- Put as much of the text in the question stem as possible – try to keep the answers short. Ideally, after reading the question stem, the learner would have an idea of what answer they are looking for before seeing the options.
- If some options are partially correct, ask learners to select the *best* answer.
- Include at least two distractors (incorrect answers) within your list of answers.
- Ensure all the distractors are plausible and a similar style and length to the correct answer.
- Good distractors might be common misconceptions or correct facts that aren't relevant to the question asked.
- Most software allows the order of the answers to be randomised. However, if your answers can be ordered by size, it's more logical to list them from smallest to largest, e.g. a) 1-5, b) 6-10, c) 11-15, d) 16-20

Try the [University of Texas' quiz](#) to see if you can pick out the better designed questions.

Some example templates for medical multiple choice questions are included in the Appendix (p.4).

Writing matching questions

A way to decide whether content is appropriate as a matching question is to consider whether the set of question stems and the set of answers could easily be presented as two columns in a table. For example, you might ask learners to match:

- key terms & their definitions
- anatomical structures & their functions
- conditions/diseases & their causes.

Tips:

- Try to keep both the question stems and answers concise.
- Present the longer phrases as question stems, and the shorter phrases/words as answer choices.
- Provide more answers options than question stems
- See the other advice for writing multiple choice questions above.

Using clear and accurate language

Everybody makes typos and grammatical mistakes. **Read your questions carefully out loud** and check that you've used full, grammatically accurate sentences for the *questions*, the *answers* and the *feedback*.

Clear and accurate language, including correct terminology and spelling is very important. *Why?*

- So that all learners fully understand the questions.
- To help students and trainees establish good habits by following your example.
- Even if sharing a draft version of the quiz for review, inaccurate language can distract people from giving you feedback on the content.
- The quiz may be viewed by many people beyond your initial teaching group, and affects people's impression of how professional the programme or organisation is.

Common mistakes to check for:

- **Spelling:** especially medical/anatomical terms and drug names.
- **Unit abbreviations:** Leave a space before unit abbreviations and don't pluralise them. See <http://ukma.org.uk/docs/ukma-style-guide.pdf>
- **Capitals:**
 - Don't capitalise key terms. Use bold or italics for emphasis, if you want.
 - Some conditions or anatomical structures do need to be capitalised – usually if named after someone, e.g. loop of Henle, Asperger's syndrome.
 - Generic drug names should not be capitalised (e.g. paracetamol), but brand names should (e.g. Panadol).
 - Be consistent. If each answer is a full sentence, make sure the first word of each answer is capitalised. If each answer is a word or phrase that completes the question stem, no capitalisation is needed.

Credits:

Case, S.M. & Swanson, D.B (2002) [Constructing Written Test Questions For the Basic and Clinical Sciences, Third Edition](#) p.39. Philadelphia: National Board of Medical Examiners.

Jackson, K. (2003) [Guidelines for writing multiple choice questions](#). University of Tasmania, Flexible Education Unit. (Based on Rees, K (1996). *Writing Multiple Choice Questions*, Deakin Australia, Deakin University)

Loughborough University CAA Centre (1999) [Designing effective objective test questions: an introductory workshop](#)

Royal Veterinary College Electronic Media Unit: *Guidelines for Writing Multiple Choice Questions*

University of Texas at Austin Instructional Assessment Resources: [Assess students: Exam](#)

Appendix: Multiple choice example templates taken from Case & Swanson (2002)

A (*patient description*) has a (*type of injury and location*). Which of the following structures is most likely to be affected?

A (*patient description*) has (*history findings*) and is taking (*medications*). Which of the following medications is the most likely cause of his (*one history, PE or lab finding*)?

A (*patient description*) has (*abnormal findings*). Which [additional] finding would suggest/suggests a diagnosis of (*disease 1*) rather than (*disease 2*)?

A (*patient description*) has (*symptoms and signs*). These observations suggest that the disease is a result of the (*absence or presence*) of which of the following (*enzymes, mechanisms*)?

A (*patient description*) follows a (*specific dietary regime*). Which of the following conditions is most likely to occur?

A (*patient description*) has (*symptoms, signs, or specific disease*) and is being treated with (*drug or drug class*). The drug acts by inhibiting which of the following (*functions, processes*)?

A (*patient description*) has (*abnormal findings*). Which of the following (*positive laboratory results*) would be expected? (*time period*) after a (*event such as trip or meal with certain foods*), a (*patient or group description*) became ill with (*symptoms and signs*). Which of the following (*organisms, agents*) is most likely to be found on analysis of (*food*)?

Following (*procedure*), a (*patient description*) develops (*symptoms and signs*). Laboratory findings show (*findings*). Which of the following is the most likely cause?

A (*patient description*) dies of (*disease*). Which of the following is the most likely finding on autopsy?

A patient has (*symptoms and signs*). Which of the following is the most likely explanation for the (*findings*)?

A (*patient description*) has (*symptoms and signs*). Exposure to which of the (*toxic agents*) is the most likely cause?

Which of the following is the most likely mechanism of the therapeutic effect of this (*drug class*) in patients with (*disease*)?

A patient has (*abnormal findings*), but (*normal findings*). Which of the following is the most likely diagnosis?

Health

Which of the following immunizations should be administered at this time?

Which of the following is the most appropriate screening test?

Which of the following tests would have predicted these findings?

Which of the following is the most appropriate intervention?

For which of the following conditions is the patient at greatest risk?

Which of the following is most likely to have prevented this condition?

Which of the following is the most appropriate next step in management to prevent [morbidity/mortality/disability]?

Which of the following should be recommended to prevent disability from this injury/condition?

Early treatment with which of the following is most likely to have prevented this patient's condition?

Supplementation with which of the following is most likely to have prevented this condition?

Mechanisms of disease

Which of the following is the most likely explanation for these findings?

Which of the following is the most likely location of the patient's lesion?

Which of the following is the most likely pathogen?

Which of the following findings is most likely to be increased/decreased?

A biopsy is most likely to show which of the following?

Diagnosis

Which of the following is the most likely diagnosis?

Which of the following is the most appropriate next step in diagnosis?

Which of the following is most likely to confirm the diagnosis?

Management

Which of the following is the most appropriate initial or next step in patient care?

Which of the following is the most effective management?

Which of the following is the most appropriate pharmacotherapy?

Which of the following is the first priority in caring for this patient? (eg, in emergency department)