

Using multiple choice questions in the classroom

How multiple choice questions can aid knowledge retention and help teachers diagnose pupils' understanding.

Why might I use multiple choice questions with my students?

There is a significant amount of research from cognitive psychologists such as Robert Bjork and Daniel Willingham that provides evidence to support what many of us might think – that repetition in learning is essential for remembering. However, this research also shows that quizzing is more effective in remembering than restudying and that repeated frequent quizzing is even more effective. (If you want to learn more, then see the links at the bottom of the page)

What is the point of using multiple choice questions with my pupils?

One way of using multiple choice questions is as an aid to knowledge recall. As mentioned above, repeated use of these types of questions helps students to remember what they have learned. Another way is as a diagnostic tool for assessing what pupils understand and what they don't. Here, carefully written answers can help the teacher diagnose exactly what misconceptions pupils have.

How do I design effective multiple choice questions?

When designing multiple choice diagnostic questions, there are two key principles to consider:

1. questions should be rigorous
2. questions should be informative to the teacher, that is, they ought to be diagnostic

Rigour

The rigour of the question is important in ensuring that the answer is not too easy to guess. For example:

Whose death is remembered on Good Friday?

- a) Jesus
- b) The President of the USA
- c) Elvis Presley
- d) my teacher

This question is of little use because even if a student couldn't remember who died on Good Friday, it is too easy to guess the correct answer.

A more rigorous question would be:

Whose death is remembered on Good Friday?

- a) Jesus
- b) Lazarus
- c) Judas
- d) Pontius Pilate

Rigour in such questions can be increased in the following ways:

- **proximity and plausibility of the answers**
 - having answers that are either close to the correct answer or are plausible answers means it is much more difficult to guess the answer
- **a wider range of answers**
 - three answers gives a 33% chance of guessing right, but five answers means a 20% chance of guessing correctly.
- **having more than one right answer**
 - this might mean having two correct answers, meaning students can't always rely on picking the first right answer they see
 - having a set of correct answers where one is a better, more accurate answer than the others requires students to use judgement skills to arrive at the most appropriate answer
- **using negative questions or reversing the question**
 - use a negative question (Which of these is NOT the right answer?) encourages students to read carefully
 - a question could be set that seeks definitions of a key word could be reversed to give different key words for a definition

Diagnostic

The second key principle is that questions should inform the teacher of the level of understanding students possess by helping them diagnose any misconceptions held by students.

This diagnostic element can be introduced into questions by regarding the following:

- **incorrect options should be plausible, but unambiguously wrong**
 - Implausible options reduce rigour, as seen above, while ambiguous answers cause confusion

- providing plausible incorrect answers helps the teacher identify misconceptions students may have
- looking back at open-questions will help identify the frequent misconceptions students hold and these can then be included in your incorrect answers
- **it should be impossible for a students to get the right answer while still holding misconceptions**
 - students should only be able to get the right answer if they have understood what they have been taught
- **they can be answered in no more than 30 seconds.**
 - they should be short because any form of multi-step question makes it more difficult to diagnose where the misconception is
- **Stretch questions can be created with comparisons or connections between topics.**
 - Opening out questions to include a synoptic element can be used to extend this beyond a single topic e.g. Which of the following is common to both Christianity and Islam?

Examples

Below are some examples of multiple choice questions that are both rigorous and diagnostic. An explanation of each has been added to explain how the question meets the two key criteria.

- Q. Which of these statements best describes the conclusion of the Design Argument?
- a) The watch is complex so the world must be complex
 - b) The watch has a watchmaker, so the world must have a worldmaker.
 - c) The watch was made but the world was not made
 - d) Both the watch and the world were made by chance
 - e) The watch and the world were made by God

Each of these statements include something about the watch and the world - students who have a vague knowledge often know that these are involved, but don't know the specific details so this will quickly assess deeper knowledge. The wording also means that students cannot quickly skim read for the key terms. They have to actually read each statement in order to choose and so it is genuinely RE assessment as opposed to a test of literacy.

Diagnostically, the student who picks E has clearly misunderstood the Design Argument and will need to go over this again. Students who choose C and D will also need to revise the topic, whereas the student who picks A probably understands the Design Argument and simply needs to think about the wording of their answer.

- Q. Christians believe in the idea of atonement. What does this mean?
- a) That Jesus was 'at one' with God.
 - b) That Jesus' death and resurrection mean that God let us off our sins by taking away our punishment.
 - c) That Jesus paid the price for human sin so that God and humans could be reconciled.
 - d) That because we are forgiven by God, it does not matter to God how we behave now.
 - e) All of the above.

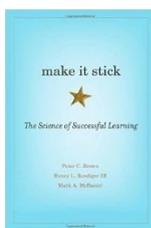
Statement A involves misunderstanding of 'at-one-ment', though it sounds plausible both because of the proximity to the word atonement and the doctrine of the Trinity, with Jesus and God as one and the same. Answer B would be selected by a student who forgets that punishment for sin is still required by God, that "the wages of sin is death". Answer C is the correct answer, while Answer D deals with a misunderstanding similar to answer B, that there are now no consequences for our actions, while E would be selected by a students who thought that all of the above statements were essentially saying the same thing.

Further details:

This guidance is based on three websites: Daisy Christodoulou's blog, [The Wing to Heaven](#), Joe Kirkby's blog [Pragmatic Reform](#) and Craig Barton's site [Diagnostic Questions](#).

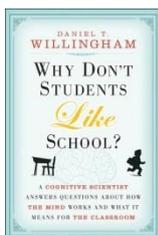
Each of these websites give practical and easy to understand explanations of how multiple choice questions can be effective in the classroom.

For more in-depth reading, try these: (click on the picture to follow the link to Amazon)



Make it Stick: The Science of Successful Learning

An easy to read explanation of how memory plays a crucial role in learning.



Why don't students like school?

Another straight forward and well written account of the how the research of cognitive science can be applied to the classroom.

And for even more depth:

[Improving Students' Learning With Effective Learning Techniques](#) is a peer-reviewed paper by five cognitive psychologists covering a century of research into this area.

Robert Bjork's research, [Applying Cognitive Psychology to Enhance Educational Practice](#), contains YouTube video interviews in which Bjork explains his findings

Useful apps and websites

		
<p>http://get.quickkeyapp.com/</p>	<p>http://www.socrative.com/</p>	<p>https://quizlet.com/</p>
<p>Quick Key marks multiple choice questions done on paper using your phone/tablet as a scanner. Useful if your students do not have mobile devices such as iPads.</p>	<p>Socrative gives live feedback to teachers as students complete multiple choice questions in class. This app requires students to have mobile devices, though it can be used vis the website.</p>	<p>Quizlet is a flash card app (can also use the website), but quizzes can be set for homework. Students can also create their own flash cards for revision.</p>