

MCQ Quizzes – They are a good thing

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Validity of using multiple-choice questions

Multiple-choice questions have been used effectively as assessment instruments for many years, especially in the area of medicine to ensure practitioners have the requisite skills of clinical practice (National Council of State Boards of Nursing 2018a). There is some evidence (Surry, Tore, Durning 2017) that the cognitive skills and level of demands of these questions align with that experienced in real-life. The need to pass these tests for licensing, in the USA, has ensured that they employ the latest technologies, including online sessions and computerised adaptive testing (National Council of State Boards of Nursing 2018b).

The practice of using audience response systems, often referred to as ‘clickers’, with multiple-choice questions is well developed in the higher education environment (Mazur 2014). Their effectiveness in the computer science classroom has been evidenced in the practice of peer instruction (Porter, et al. 2016).

The online version of ‘clickers’ meets ‘multiple-choice’ is available in systems such as Kahoot!, Socrative, and Diagnostic Questions. However, these systems offer much more to both the learner and the teacher.

Benefits of using quizzes

Learner motivation

When used in the classroom, the competitive atmosphere induced, has been reported to increase engagement and motivation (Cutri, et al. 2016).

Many of these systems incorporate virtual rewards, such as badges. The introduction of these gamification techniques are reported to increase engagement. (Goodyear and Nathan-Roberts 2017)

Sharing workload

The multiple-choice questions on these platforms are crowd-sourced, thereby reducing the need for individual teachers to write all their own questions. Even the quizzes can be made public and shared among all the users of the system.

Pedagogic value

Used in combination, a series of quizzes makes a formidable tool in both formative and summative assessment (Soderstrom and Bjork 2015). Quizzes can be set as baselines, used before teaching the topic, as a way of finding out what learners already know. Another, yet similar quiz can be used immediately at the end of a topic, such as an end-of-unit test. This is useful for identifying improvement and reporting. Yet another, but similar quiz can be used some time after the end of a topic, such as 3 weeks later, to ensure that the content has become embedded. If gaps appear at this time, then teachers have the option to revisit the topics.

Quizzes can be used as revision for end-of-topic tests, GCSE, or GCE. On the Diagnostic Questions platform, collections of questions have been provided around all the topics in the Computer Science syllabi. Collections also exist for the Key Stage 3 programme of study for computing.

Well-written multiple-choice questions, with plausible distractors based on misconceptions, allows the teacher not only to understand what learners know, but to diagnose which misconception they possess.

Flexibility of delivery

Questions and quizzes can be used in the classroom and set as out-of-class activities.

A short set of questions can be used as a starter activity. “You can see at a glance whether students have remembered the answers and students get to have their illusion of knowledge revealed; often they might think they know something only to have their ignorance revealed when asked a direct question” (Didau 2016).

The multiple-choice questions allow peer instruction (Mazur 2014) to be used in the classroom. Individual white boards are just as effective as ‘clickers’ to inform the teacher of the need for learners to engage in discussion.

Learners can create and upload their own questions and quizzes. These can then be shared with the rest of the class.

Informative analytics

The online systems allow teachers to collect data about the responses of individuals, classes, or larger groups of users (Sentence, Selby, Kallia 2018). This will allow teachers to compare different classes and develop targeted interventions.

The quizzes are marked immediately and scores are reported to the learner. In addition, some systems incorporate mechanisms for delivering customised feedback when an option is selected.

Teachers can review the results of their own classes. They can compare the performance of individuals and classes to the entire cohort of learners who responded to the question.

The Diagnostic Question system provides analysis of individual student responses, which can be tied to topic areas. It’s a very visual way to identify specific topic areas for each learner.

Multiple-choice questions can be used as hinge questions (William 2008). When these being embedded into quizzes, the teacher can identify which learners are ready to progress to the next topic and which are not yet ready.

Considerations with writing questions

Although multiple-choice questions sometime seem an easy option, writing effective questions can be challenging. Teachers should never waste the opportunity to learn something by asking a question. Multiple-choice questions give teachers the opportunity to find out if a learner knows the correct answer. That’s the easy part.

The more challenging part is using the same question to diagnose a learner’s misconception. To do this, the author of the question needs to design plausible distractors based on misconceptions. Knowing that 10% of a class has the same misconception about a topic is good information that can feed formatively into the next set of lessons.

One very effective way to generate plausible distractors is to base them on actual learner responses to equivalent free-form questions (Ali, Carr, Ruit 2016). Alternatively, teachers often are already familiar with the types of misconceptions their learners have. These are fertile fields for plausible distractors.

Another challenge is writing multiple-choice questions to address higher-order thinking skills. There are some suggested strategies for creating questions that assess these skills. These include manipulation of the target verb, item flipping, using high-quality distractors, and multi-neuron items (Scully 2017). The NCLEX, an online assessment used to determine whether a training nurse receives a license to practice in the USA, purports to assess the higher-order thinking skills of application and analysis (Kaplan Nursing n.d.).

Conclusion

Without doubt, multiple-choice questions have benefits for both learners and teachers. Used from a summative perspective, they offer ease of administration, immediate marking, and collated results that can be directly transferred to school reporting systems. Used from a formative perspective, they offer opportunities to refine understanding of learners' misconceptions, to promote peer instruction, and to motivate and engage learners.

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