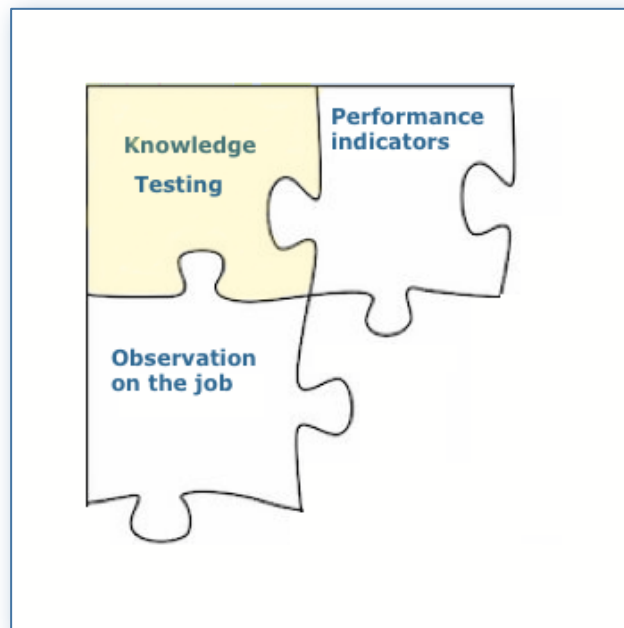# Knowledge testing as part of competence assessment

Knowledge testing can play an important part in the measurement and development of competence. It is evident that if an employee does not have the core underpinning knowledge, then no matter how well-motivated or keen they are to do a good job, they will not know what to do. However, knowledge testing is only part of the competence assessment picture – it is a useful tool not a complete toolset.

Effective knowledge testing will identify gaps in the knowledge of individual employees and also any trends in the knowledge weaknesses of groups of people working in an organization. This can help the HR and Training function to focus effort on the areas of greatest need and make best use of scarce resources.

Knowledge testing can also help to encourage employees to retain the knowledge they have learnt, by providing a focus and a reminder that work-related information is not just for use on training courses.

Why use e-assessment?

The benefits of e-assessment to test knowledge include:

- **Availability** – tests available to candidates 24/7 which can really help shift-workers in particular. Also tests can be slotted into work schedules during downtime rather than requiring employees to book specific time away from work
- **Mobility** – tests may be taken anywhere with the use of mobile devices such as iPads, Android tablets, smartphones and laptops
- **Objectivity** – tests are automatically marked and there can be no subjective influence on results

- **Immediacy** – results are provided as soon as the employee finishes the test so there's no waiting around or marking time for the trainer

- **Transparency** – good systems will support the manager or training manager being able to review the candidates' complete test records so that any claims of right answers being marked wrong can be checked immediately

- **Specific feedback** – tests can be set up to guide people with a less than perfect score to revise specific areas of knowledge

- **Cost-effectiveness** – online tests are a particularly economical way of testing knowledge as costs are scalable and predictable

- **Complete audit trails** – particularly useful where issues of regulatory requirements or compliance records are required

- **Easy analysis of data** – to identify knowledge gaps/weaknesses either in specific areas or in specific groups of employees

Effective e-assessment

In order for knowledge testing to be effective it has to be appropriately focused on the essential knowledge required for competence in a specific area and it also has to be sufficiently 'testing' to identify people who lack knowledge. One of the main complaints about computerized testing schemes is that they rely on multiple-choice questions that often offer a 1 in 4 chance of guessing the correct answer. This can drop to as low as 1 in 2 if the distractor options are poorly devised. However, this does not need to be the case, for example, questions that require candidates to drag several items into place or order are extremely difficult to guess correctly.

These example screenshots show that it is possible to devise questions that test knowledge effectively within an e-

assessment system, but that such questions can be more challenging to author than a simple multiple choice.

There are other forms of questions such as hotspots and free text entry that can test a candidate's grasp of the underpinning knowledge more stringently.
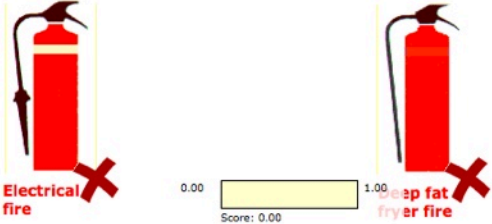

Where tests have been set up with categories, it is possible to highlight to candidates exactly which areas of knowledge they need to review – and even point them to revision units available on the e-assessment system to help them improve their knowledge.

For example, suppose a candidate needs to be able to

identify the correct fire extinguisher to use given a particular type of fire in order to pass a fire safety course

In this case, the candidate who answered the question below wrongly might be advised to look at the revision unit covering this area (see below for example).
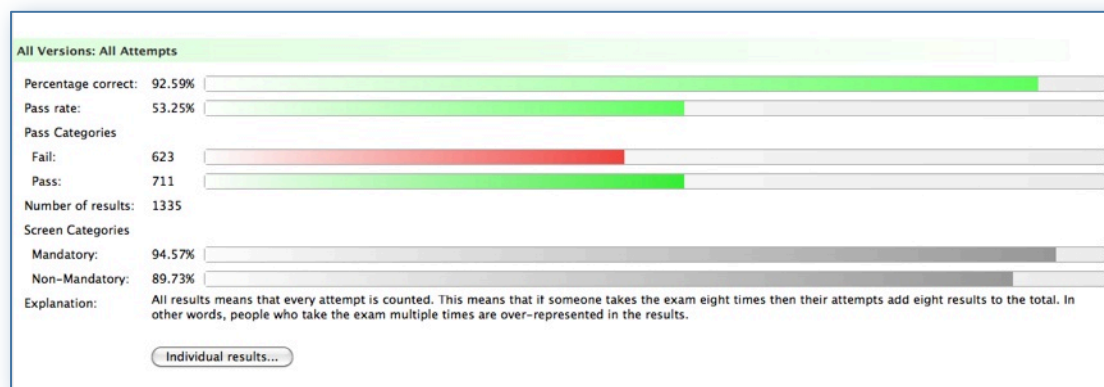
You need to use different fire extinguishers to deal with different types of fire, as described below. Different fire extinguishers are colour coded and marked with their type.

TYPE OF FIRE EXTINGUISHER	WOOD, PAPER, TEXTILES	PETROL OR SPIRITS	ELECTRICAL EQUIPMENT	COOKING OIL OR FAT
WATER FIRE EXTINGUISHER	✔	✘	✘	✘
CARBON DIOXIDE FIRE EXTINGUISHER	✘	✔	✔	✘
WET CHEMICAL EXTINGUISHER	✔	✘	✘	✔
FOAM FIRE EXTINGUISHER	✔	✔	✘	✘

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Data analysis

Users with higher admin privileges can view a number of reports showing all users' results and this can provide a useful analysis of cross-the-board performance. Additionally, question analyses that highlight those questions that provoke the most frequent wrong answers can be very useful in identifying specific areas that need further knowledge development.

Managers can be given the right to review tests on a screen-by-screen basis where appropriate and this enables them to open an individual's test and step through all the questions (with their answers and marks showing) – which can be very useful when reviewing knowledge gaps with an individual.

Question Tools is a specialist e-assessment software developer based in Humberside. It has been providing software tools for the development of e-assessment systems for over a decade, including a system that helps Network Rail track the knowledge of its 23,000+ staff and one for the British Computer Society for ECDL which collected over half a million results from colleges nationwide. Its original Editor application (one of the first GUI question editors developed for this area) has been used in over 140 countries worldwide. Its latest version of its software is multi-platform and supports tests running on a wide range of mobile devices.

It has provided and managed the software and tests that comprise the Network Rail Assessment in the Line system since 2006 – a system that now contains over 1.5 million test results (all immediately accessible from the Question Tools' system).

It also offers its own range of 40+ exams in the Basic/Work skills areas under its InstantExam subscription service. Subscribers to this service can have an e-assessment programme running in less than 10 minutes from signing up.

www.questiontools.com