

A Doctor Does Not Get Five Choices

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If you are involved in the assessment of medical knowledge, you may be interested to know that the Medical School at the University of Dundee now assess all undergraduate medical students using an on-screen, computer-marked test. You may be even more interested to know that the questions are not multiple choice, they're short-answer free-text. And that the system was recently awarded the Scottish e-Assessment Award for Summative Assessment.

Introduction

The Medical School at the University of Dundee offers a high quality teaching programme, and was ranked Top UK Medical School in the Guardian 2009 University Guide. The School has a history of educational innovation, and one example of this was the introduction of the Progress Test (see inset panel) to reinforce the assessment processes. In its initial paper-based form however, the Progress Test imposed a very heavy marking and administration burden on the School. The computerisation of this test has alleviated these issues, and allowed the Progress Test to become integrated as an essential part of the curriculum. Moreover, it has provided the Medical School with rich formative data to support the teaching and learning process.

When the Dundee Progress Test was designed, Multiple Choice questions were discounted on the basis that "A Doctor does not get five choices". Fundamentally, the test had to be one of recall, not recognition [1]. The Dundee Progress Test therefore, is comprised of short-answer free-text questions. Many of these questions can be

The Dundee Progress Test

A test of the basic core knowledge of medical students

Questions by subject and year in proportion to curriculum time

All five years sit the same examination

270 short answer questions – no prompting or triggers

New questions are added to the bank each year, and require moderation the first year they are used

Sample based checking of computerised marking for the new questions (using year 5 students to provide the sample).

answered with a single phrase (for example, the name of a treatment or a drug). Others require more of an explanation. An example question is shown in the table below. Questions for each year's test are selected from a bank of several hundred submitted by faculty teachers.

Question Text	Marking Guideline
<i>Two days after a myocardial infarction a 50 year old man is found to have persistent fine crepitations (crackles) at both lung bases. What is the most likely cause?</i>	Accept : Left ventricular failure/ LVF/ Pulmonary (pulm) oedema/ Heart failure/ ventricular failure Don't accept : congestive/ right heart failure.

Typically, questions of this type cannot be accurately marked by available e-assessment software. However the ExamOnline system developed by Intelligent Assessment Technologies (IAT) does have that capability. One of the advantages of working with a small supplier such as IAT has been that the School were able to ensure that ExamOnline's design was specifically customised to support the Progress Test in several ways, including the following :

- The test contains 270 short-answer questions, and so a custom paginated delivery interface was developed (see Figure 1). This interface provides eight short-answer questions on each page, with a colour-coded navigation bar along the bottom. Each box in the navigation bar represents a page of questions: green boxes indicate that all questions on those pages have been answered; red indicates that there are some unanswered questions.
- A computer-based moderation system which allows rapid scanning of marked responses gives the facility to moderate the computer marking.

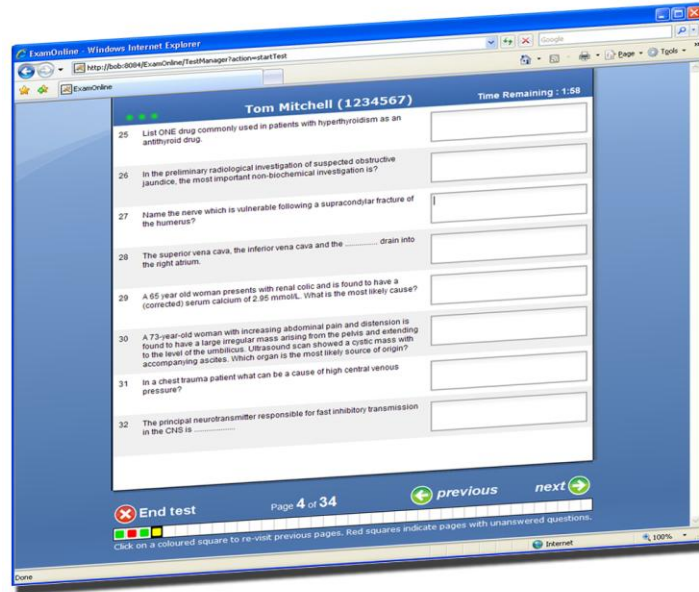


Figure 1. Progress Test delivery on the ExamOnline platform.

As a result of the collaboration between Dundee and IAT, the ExamOnline platform has now evolved to be a powerful tool for the assessment of medical knowledge. Moreover it is fully browser based, with simple, intuitive interfaces.

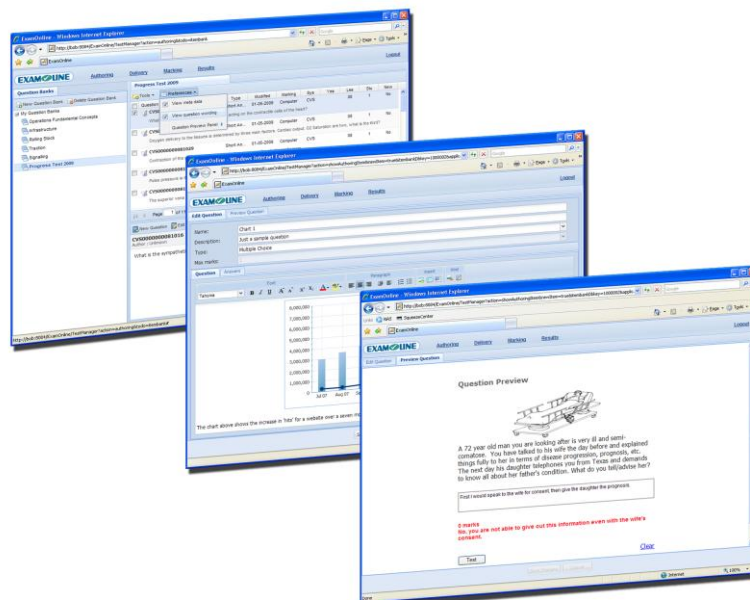


Figure 2. Browser based authoring and administration through ExamOnline.

The system exhibits one further area of note, in that an innovative question coding scheme has been used to tag each question. As a result of this coding scheme, and the automatic short-answer marking capabilities of ExamOnline, students benefit from detailed feedback of performance versus their peers, and the Medical School is able to measure, for example, the year on year growth of cohort knowledge (see Figure 3).

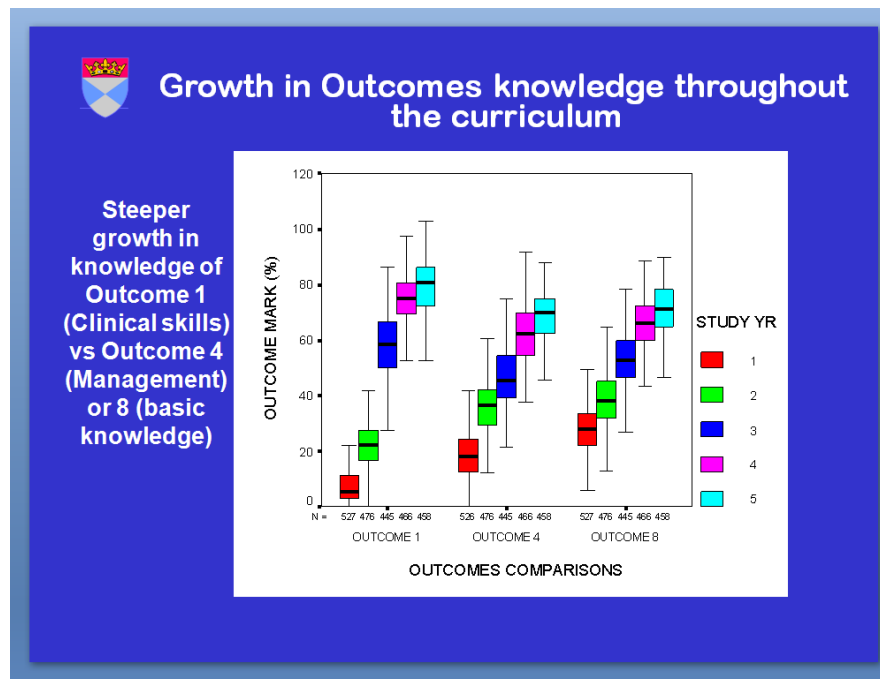


Figure 3. Growth in Outcome Knowledge as measured by the Progress Test

From Years 1 to 4 the results (grouped by study year, subject, curriculum outcome, clinical block, etc) provide formative feedback to students; in Year 5 the test is used to provide summative evidence of knowledge, and is a required component of Finals exam portfolios.

The Student View

The students have readily adapted to the online exam format, and have appreciated the consistency of marking which computer software can give by contrast with the vagaries of hand-marking. The formative feedback of results in Years 1-4 has also been viewed constructively by students. Medical students are very competitive, and the detailed level of feedback which the Progress Test provides is eagerly sought.

The Faculty View

The open-ended, non-triggered, nature of the free-text response, which provides no clues to the 'correct' answer, has also been viewed positively by faculty, as this is similar to the open question and answer dialogue which goes with small group learning and teaching. In addition, the free-text nature of the responses has some resonance with those members of faculty who have previously used old-style oral exams – but who have had to abandon this type of assessment in the face of its poor validity and reliability. By contrast, the computer marked Progress Tests have an alpha reliability coefficient in excess of 0.95.

References

Veloski, J.J., Rabinowitz, H.K, Robeson, H.R., & Young, P.R. Patients don't present with five choices: An alternative to multiple-choice tests in assessing physicians' competence. *Academic Medicine*. 1999; 74 (5): 539-546

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