Can e-learning improve medical students’ ability to interpret chest x-rays in comparison with electronic text?

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Introduction
Medical graduates have difficulty in interpreting simple chest x-rays and are not confident in their identification of life-threatening radiological diagnoses though they are normally the first medical contact of the deteriorating patient (1). Surveys reveal minimal exposure to radiology teaching during undergraduate training despite the belief that radiology plays an important role in clinical practice (2,3). Medical graduates have difficulty in interpreting simple chest x-rays and are not confident in their identification of life-threatening diagnoses though they are normally the first medical contact of the deteriorating patient (1).

Aims & Objectives
The primary aim of this study was to determine whether an e-learning package could be used as an additional resource to improve the knowledge and competence of medical students in interpreting chest x-rays and to contrast this with existing e-learning tools already being used, primarily textbooks, and identify whether this would be a favourable option.

Methods
Before this prospective cohort study, the University of Liverpool (UoL) students at the Royal Liverpool University Hospital were asked to fill out a questionnaire to identify previous experience of radiology training, levels of confidence in interpreting chest x-rays and willingness to act on their interpretation of chest x-rays.

Following this, the students completed a chest x-ray interpretation test before being randomly allocated to one of two interventions from the 16th of May to the 9th of June 2011:

1. The Image Interpretation Project, a free interactive e-learning resource based on a national syllabus in basic image interpretation for reporting radiographers and relevant NHS staff delivered by the College of Radiographers and e-learning for Healthcare [www.elfh.org.uk]
2. A recommended e-textbook on chest x-ray interpretation [4].

At the end of the study, the students completed a second questionnaire and repeated the chest x-ray interpretation test.

Results
23 students completed the study, 26% of whom were final year students and 74%, second year students.

Quantitative
The average pre-study and post-study score were 22.9% and 33.6% respectively, with a difference of 10.7%. A general linear model was used to assess the significance of some kind (e-learning or e-textbook) on the post study results but no significant difference between e-learning resource or the e-textbook.

Fig 1. Confidence in acting on chest x-ray interpretation pre-intervention

Qualitative
Before the intervention, 47% reported no formal training in chest x-ray interpretation though 73% of students reported that they had received informal training (ward-based teaching) on chest x-rays. 74% reported that they would not be confident in acting on their interpretation of chest x-rays (fig 1.)

90% of the students who used the e-learning package reported an improvement in their confidence interpreting chest x-rays (fig 2.) compared to 38% of those who used the e-textbook (fig 3.). 100% of students allocated to the e-learning package found the material engaging compared with 15% of the e-textbook group.

Conclusion
These results demonstrate a significant improvement in the students’ knowledge and confidence of chest x-ray interpretation following an intervention (e-learning or e-textbook) though there was no significant difference between the two interventions.

The questionnaire results, however, make evident that there was a clear preference for the interactive e-learning tool and students found the resource very engaging and useful. This is consistent with reports that show e-learning to be a favourable learning tool by students (5).

This high rating suggests that an interactive e-learning tool would be utilized by students and would serve as a beneficial educational resource for a student-led approach in medical education as recommended by the General Medical Council 2009 publication, Tomorrow’s Doctors (6).

This study demonstrates that e-learning can improve the chest x-ray interpretation skills of medical students in preparation for their post-graduate training, thus ensuring better management of patients and an improvement in patient safety.

References: