



A pilot study to evaluate the use of virtual lectures for undergraduate radiology teaching



Francisco Sendra-Portero*, Oscar E. Torales-Chaparro¹, Miguel J. Ruiz-Gómez², Manuel Martínez-Morillo¹

Departamento de Radiología y Medicina Física, Facultad de Medicina, Universidad de Málaga, Boulevard Louis Pasteur, 32, 29071 Málaga, Spain

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ABSTRACT

Purpose: To demonstrate that virtual lectures can substitute conventional lectures in radiology education for medical students.

Methods and materials: During the course 2005–2006, 89 out from 191 (46.6%) third year students of a subject entitled “General Radiology”, participated voluntarily in a pilot study including 22 virtual lectures (Flash presentations translated from the same PowerPoint presentations of conventional lectures, adding recorded narration and navigation tools). Participants (P) studied by means of virtual lectures, while non-participants (NP) assisted to conventional lectures.

The results of the final oral exam classified from 0 to 3, and a 60-questions evaluation on image interpretation were used to compare both groups after training. Finally, 34 students from the group P (38.2%) fulfilled a 10-points scale quality survey about the project.

Results: Final exam qualifications were significantly higher for P than for NP (2.11 ± 0.85 versus 1.73 ± 1.04) as well as the number of correct answers of the evaluation on image interpretation (24.2 ± 6.2 versus 21.2 ± 5.4), but differences could obey to different attitudes between both groups. The usefulness of virtual lectures to learn General Radiology obtained the highest global scoring (8.82 ± 1.00). Contents were generally better evaluated than the design of the presentations.

Conclusion: Virtual lectures can substitute conventional lectures in radiology education for medical students with no detriment to students' learning. Their potential advantage is that magisterial lectures can be used to discuss contents with students in a more participative way if virtual lectures are provided before.

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1. Introduction

Lectures are a “classic” method in medical education, where a typical scenario could be:

- A PowerPoint presentation is projected on a screen
- A lecturer is giving an oral exposition of the topic
- An audience of students is taking notes during the lecture

This scenario has some inconveniences that may lead to disliked situations. As the opportunity to attend a lecture use to be only one, part of the lecture can be missed because of distractions, poor listening, fast speaking speed, or any other problems to follow the

narrative line. Frequently, the speaker is requested to repeat missed parts, and this can lead to excessive interruptions for the normal flow of the lecture. Students can be more concerned about taking good notes (sometimes trying to transcript the narration) than about the understanding of the lecture. All this adversely affects the value of the face-to-face meeting between the lecturer and the group of students that a lecture implies.

Online training tools have become complements or even alternative to traditional resources for acquiring new knowledge [1]. Nowadays, technology allows converting PowerPoint presentations into on-line, voice accompanied presentations, matching the same contents, accessed at home or wherever the student prefers, as many times as desired, by means of Internet streaming. These kinds of presentations that replicate the traditional mode of delivery of lectures to a class are called “virtual lectures” [2].

The purpose of this study was to demonstrate that virtual lectures can substitute magisterial lectures in radiology education for medical students without detriment of their learning. Once demonstrated, the physical and temporal space dedicated to magisterial lectures could be reserved to discuss contents.

* Corresponding author. Tel.: +34 952131653; fax: +34 952131630.

E-mail addresses: sendra@uma.es (F. Sendra-Portero), oetjft@terra.es (O.E. Torales-Chaparro), mjrg@uma.es (M.J. Ruiz-Gómez), mmorillo@uma.es (M. Martínez-Morillo).

¹ Tel.: +34 952131631; fax: +34 952131630.

² Tel.: +34 952131578; fax: +34 952131630.

2. Materials and methods

2.1. The study design

In February 2006, third-year medical students, enrolled in a four-monthly obligatory subject entitled “General Radiology”, were invited to participate in a virtual learning pilot study.

The subject included 30 theoretical lessons given from 15th February to 24th May, organized as classical lectures. Twenty-two lessons dedicated to diagnostic radiology were included in this project. Participants (P) students did not assist to those 22 theoretical lectures but studied by means of virtual lectures accessible via Internet using a personal password, while non participants (NP) assisted to conventional lectures. Access to each virtual lecture was provided to students from the group P at around the same time than the corresponding conventional lecture and remained available to them during the rest of the course. The remaining 8 lessons were distributed into introduction (1 lesson), nuclear medicine (5 lessons) and fundamentals of radiation therapy (2 lessons) and were given by conventional lectures (both NP and P must assist to them). Both groups (P and NP) also followed the rest of the subject (practices and seminars). All students had access to PDF printable files of the lecture slides during the course.

2.2. The virtual lectures

The process of creating virtual lectures comprised four steps: (1) creation of PowerPoint files, (2) recording voice narration, (3)

conversion into Flash presentation, and (4) uploading to a Web sever.

A set of 22 PowerPoint presentations matching the contents and the appearance of the respective conventional lectures was created with Office 2003 (Microsoft Corporation USA, 2003). All presentations had a homogeneous interface with some navigation tools such as “forward”, “backward”, “repeat slide” or “main menu” buttons (Fig. 1). All lectures started with a black-background front page with the title of the topic and a representative image. The second screen (home page) contained an interactive main menu, which allowed jumping to the different parts of the lecture. The remaining screens showed text, draws and schemes, pictures (equipments, procedures, etc.) or radiological images. The last screen (back page) repeated the first one.

Voice narration of each lecture was recorded with the PowerPoint 2003 “Record Narration” tool from the “Slide Show” menu. Flash presentations were obtained with PointeCast Publisher 4.3.1.192 (Helios Inc., Utah), a PowerPoint plug-in that automatically converts PowerPoint 2003 presentations, including sound, effects and animations, into Flash presentations.

The whole set of 22 virtual lectures integrates a virtual learning project entitled AMERAM (Aplicación Multimedia para la Enseñanza de Radiología a Alumnos de Medicina) and is still freely available from the Webpage of the project www.ameram.es. The contents of the current version 1.0, used in this study, are summarized as follows: (1) the number of screens per lecture is variable, with an average of 53 ± 12 (mean \pm standard deviation) ranging from 34 to 74; (2) the whole project includes 1558 screens; (3) discounting 66 corresponding to front page, home page and back page

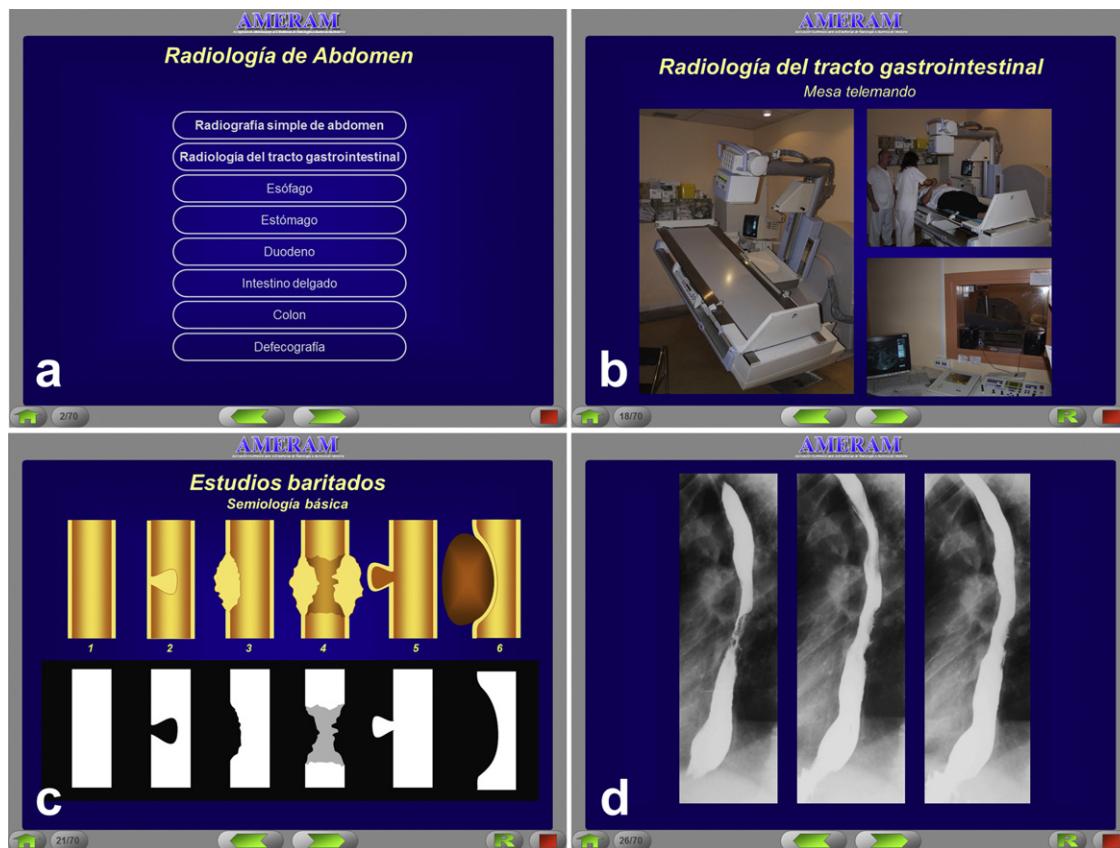


Fig. 1. Screenshot images from four slides corresponding to the lecture 11, abdominal radiology. (a) Home page with the interactive main menu. (b) Pictures of the X-rays equipment to perform barium procedures. (c) Drawn schemas to explain semiology of the barium studies. (d) Images of a barium esophagogram showing an irregular contour in the middle third corresponding to a esophageal cancer. All slides show in the lower part of the gray frame (from left to right) the “home page” button, an indicator of the slide number respect to the number of slides of the lecture, “backward” and “forward” buttons, the “repeat slide” button, and the “exit” button.

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