

Some results after three years of using the European multimedia course for training on radiation protection for interventional radiology

E. Guibelalde⁽¹⁾, E. Vano^(1,2), L. González⁽¹⁾

⁽¹⁾Dept. of Radiology. University Complutense of Madrid, Madrid, Spain

⁽²⁾Medical Physics Service of San Carlos Univ. Hospital, Madrid, Spain

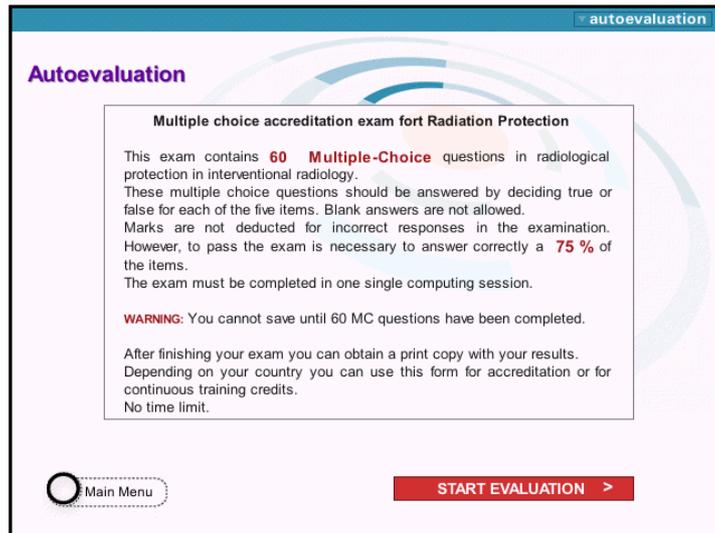
Abstract

The European Commission sponsored and published in the year 2000 (Radiation Protection Series N. 119) a multimedia programme on Radiation Protection Training in Interventional Radiology (MARTIR programme) containing basic and advanced topics of radiation protection and quality assurance. Some features of the interactive CD are: 80 lessons organized in 5 chapters; videos, images and presentations with free access for users; simple use of the CD as a bibliographic tool seeking only for the topics of interest combined with the possibility of following a tailored training programme at home as a monitored course (all student information including visited lessons and time used for each session is monitored in an encrypted file). In this modality students must pass a short multiple choice evaluations to continue with the next chapter and to perform a final examination at the end of the course. Software automatically emits a certification with the total time dedicated to the training programme and the obtained score. In this work the experience for three years of using the CD for different types of courses (for medical physicists, for medicine -pre and post graduated students, for X-ray technicians) is analysed and presented.

1. Introduction

A multimedia course on Radiation Protection Training in Interventional Radiology (MARTIR programme) containing basic and advanced objectives for radiation protection and quality control was sponsored in the period 2000-2002 by the European Commission. Two video-tapes and a CD were published as result as an issue of the Radiation Protection Series [1].

Chapter	Topic	Course Level
Radiation protection of the staff	40 Dosimetry and Dosimetric methods	Advanced
	41 Literature surveys on staff doses	Advanced
	42 Suspended screens and curtains	Basic
	43 Lead aprons	Basic
	44 Protective gloves	Basic
Radiation protection of the patient	45 Eye protection	Basic
	46 Thyroid protection	Basic
	47 Influence of X-ray equipment technical parameters... Influence of relative position of the staff	Basic
	48 to the patient and X-ray tube	Basic
	49 to the TV monitors inside the room	Basic
	50 Influence of staff training	Basic
Radiation protection of the patient	51 General aspects of dosimetry methods	Advanced
	Dosimetric methods	
	52 Entrance Surface dose	Advanced
	53 Dose area product	Advanced
	54 Organ doses and effective dose	Advanced
	55 Slow film method	Advanced
	56 Other skin dosimetry methods	Advanced
	57 Diagnostic Reference Levels	Advanced
	Influence of X-ray equipment technical parameters	
	58 Image acquisition modes	Basic
	59 Collimation and magnification	Basic
	60 Influence of complexity of procedures	Basic
	61 Influence of the patient relative position to X-ray tube...	Basic
	62 Influence of the projection	Basic
	63 Influence of the patient size	Basic
64 Influence of removing the grid	Basic	



The main features of the interactive CD read as follows:

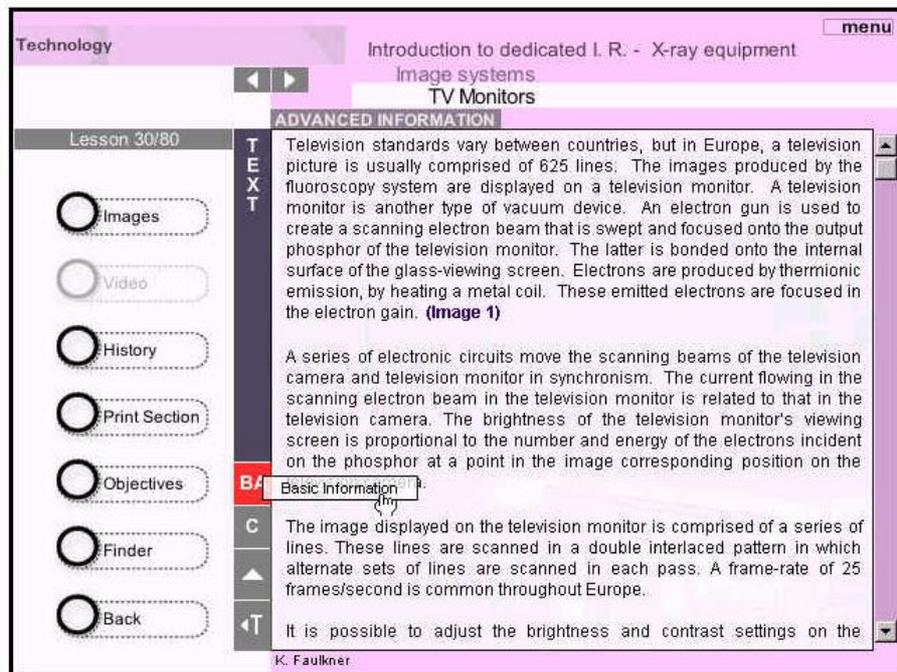
- Distributed cost free in the main European languages;
- The course is organized in five chapters (General, Fundamentals of Radiation Protection Physics, Technology, Staff and Patient Radiation Protection, Quality Control);
- Different levels of training can be selected (for radiologists, cardiologists, medical physicists, radiographers);
- The student can follow the course completely at home including a final multiple choice test examination. The programme generates after that a printable certification with the total time dedicated to the training programme and the obtained score;
- When the student enters the CD as a registered user and decides to follow the regular course, the programme starts the first lesson and forces to follow step-by-step. Then, it is necessary to pass a short auto evaluation test to be able to go next chapter. This feature allows an external survey of the student progresses;
- By means of a small encrypted file (that is automatically saved at the student computer) the tutor is able to survey the dedicated time employed by the student for each chapter, how many times student has tried to pass each chapter, how many times has tried to pass the final test and detailed information of correct and wrong answers. Those encrypted files are only visible with a protected program also included in MARTIR CD.

User's Name Eliseo Vañó Galván		Exam Date 08/05/01		Open User
General Results		Section Results		
PASS		General	22 Marks	88 % Correct Answers
294 Marks	98 % Correct Answers	Fundamentals of Radiation Physics and Introduction to Radiation Protection	50 Marks	100 % Correct Answers
Speciality Radiologist		Technology	73 Marks	97 % Correct Answers
Elapsed Time 01:08:33		Radiation Protection in Interventional Radiology	100 Marks	100 % Correct Answers
		Quality Assurance in Interventional Radiology	49 Marks	98 % Correct Answers
				Exits
				Options
				Exit

The CD-ROM can also be used as a bibliographic manual to review the knowledge in radiation protection without following any regular course. It contains 80 lessons with their texts, 350 images, 30 videos, 25 power point slide presentations and a good collection of references and links updated for the year 2001. This material is not protected so that people can use it freely, assuming a proper use of EC copyright and referring the source. An interactive glossary with most common radiation protection terms is also included. A non-readable database with three hundred 5-true/false multiple-choice

questions, sorted in different levels of difficulty is used for the program to computing the individual accreditation exam.

To go ahead with these actions, the EC decided to promote during 2002, a forum with the main Medical European Societies involved in these interventional procedures: Cardiovascular and Interventional Radiological Society of Europe, CIRSE; European Society of Vascular Surgery, ESVS; European Society of Cardiology, ESC. Unfortunately this forum was finally not initiated.



2. Some previous experiences with the MARTIR CD-rom

During 2001 and 2002 the MARTIR material was distributed for evaluation purposes to different experts and it was used in different pilot courses.

Comments received from the European experts. About 40 different experts including radiologists, cardiologists, vascular surgeons, neuroradiologists, medical physicists, technicians, manufacturers and members of regulation boards received copies of the CD at the development stage so that their valuable comments and suggestion for improvement were included when possible. Most experts consider that the CD media is a good tool that allows a wider and cheaper distribution than other conventional courses. Thus a common basic training could be more easily achieved by specialists in different countries and with different background knowledge. CD has also the possibility of being easily upgraded or updated with new information or new accreditation exams.

Students of the School of Medicine. The University Complutense of Madrid offers an optional subject on Radiation Protection for the students of Medicine during their 4th or 5th year. About 70 students follow this topic per year. Since 2002 some of these students follow the MARTIR CD at home as a complementary course. All of them used the CD at least during 40 hours, completed the intermediate level step-by-step course and pass the exam (score over 75% for 60 true-false multiple choice questions). Students have the opportunity of improving the qualification as many times as they wish by repeating the electronic exam. 87% of the students after finishing the course stated that this education methodology was very suitable for them.

As an example of result, it is interesting to point that MARTIR was followed together with a conventional course during the course 2004-2005 by 75 students at the Faculty of Medicine. Comparable marks with the electronic exam and with the conventional exam were obtained for 55 students and the qualification was undoubtedly assigned. The rest was required to repeat the MARTIR exam in presence of the tutor to confirm the assigned qualification (in this category were student with

score 100%; student that fails the exam more than three times; student that finish the course in less than the average time or student with clear differences between the MARTIR electronic exam and the conventional exam).

The course is now regularly used as a complementary material for continuous training courses organized annually by the Spanish Society of Vascular and Interventional Radiology for his members. Different courses organized by different French, Italian and German Scientific Societies have also used this material.

3. Conclusions

An effort must be done to encourage interventionalists to follow training courses in Radiation Protection, particularly when basic courses of RP are not included in their curricula. MARTIR CD offers solutions to complement conventional Radiation Protection courses, e.g., for countries where no official accreditation is required, for training of fellows working in interventional labs while waiting for a regular course, for educational material for lecturers in regular courses, for continuous training programs, and so on.

References

- [1] MARTIR (Multimedia and Audiovisual Radiation Protection Training in Interventional Radiology). CD-ROM. Radiation Protection 119, European Commission. Directorate General Environment, Nuclear Safety and Civil Protection. Luxembourg, 2002 (free available).

Corresponding Author:

Eduardo Guibelalde
Complutense University of Madrid
Medical Faculty, Radiology Unit
Avenida Complutense
28240 Madrid
Spain
T: +34 91 3941551
F: +34 91 3941675
e-mail: egc@med.ucm.es