

e-BOOK “THE PIONEERING OF E-LEARNING IN MEDICAL PHYSICS” (The development of e-Books, Image Databases, e-Dictionary and e-Encyclopedia)

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Abstract— The e-book “The Pioneering of e-Learning in Medical Physics” describes a chronology of 7 international projects (1994-2014) which are among the first in the world to develop and introduce original e-learning in the teaching process (all projects are in the field of medical physics).

Keywords— Education and Training , e-Learning

I. INTRODUCTION

The period 1990-2010 was very important for education and training in medical physics and for the international growth of the profession. The developments during these two decades naturally followed the innovations in medical technology during the previous two decades (1970s and 80s) when many new types of medical equipment were introduced in healthcare – e.g. Diagnostic Ultrasound, Computed Tomography, Positron Emission Tomography, Magnetic Resonance Imaging, etc. The workforce of medical physicists, dealing with the safe and effective medical use of this equipment, needed new forms of expanded education and specialised practical training.

Studying this medical technology was related to its practical use, but very limited time was available for training, as the medical equipment is used intensively for diagnostic and therapeutic purposes. Also, the dynamic development of the profession needed equally fast and flexible methods for development of such materials. At that time the customary printed media involved a significant period between the development of the materials and their paper print. The answer to this was in the use of IT technology for development of effective teaching materials.

II. BOOK DESCRIPTION

On this background a project team of specialists with considerable teaching experience (from UK, Sweden, Italy, Portugal, Ireland and Bulgaria) took on the task of developing the first e-learning materials in medical physics. The team has not followed other e-learning examples, as at the time no publications with practical methods and steps for development of e-learning materials existed. The book describes how the projects Consortia solved the task through a sequence of 7 fully original projects (Fig.1). The

book aims to give a more detailed description of this development process, its challenges and successes, as well as the testing and implementation of e-learning in the profession – an experience which could be useful to other e-learning developers and colleagues (this is consistent with the main concept of the projects - “learning through examples”). In this way the book keeps the chronology of the creation of the ideas and their development through various stages, as well as the methodology applied for this.

The first projects described in the book were initiated when the terms *e-learning* and *e-books* did not exist. Today these are parts of the educational process and medical physicists could be proud that the profession was one of the first in the world to develop its own original electronic Image Databases, e-books and fully embrace e-learning. The team of ‘pioneers’ also believed in the advantages of e-publishing and was one of the first in the world to publish Educational Image Databases CD-ROMs with ISBN numbers – i.e. as printed books. The first such materials are:

- Atlas of Pathology: Urological Pathology CD-ROM, 30 Dec 1997, Springer-Verlag, ISBN 3540146571
- EMERALD Image Database, Training Courses in Medical Radiation Physics CD-ROM, 19 February 1998, King’s College London, ISBN 1870722035
- Developmental Psychology Image Database CD-ROM, 30 April 1998, McGraw-Hill, ISBN 0072896914

The outcomes of the 7 international educational projects (1994-2014) can be summarised as:

- Four International Conferences on Medical Physics Education and Training (with attendees from 36 countries)
- Five textbooks (Workbooks) with training tasks in Medical Physics and two related Teacher’s Guides
- Five e-books based on the above Workbooks (including 250 training tasks, explained in 1300 pages)
- Five CD-ROMs with Image Databases for Medical Physics training (with 3100 images)
- Three Educational web sites in Medical Physics (with volume about 1GB)
- A Multilingual Dictionary of Medical Physics (translated in 29 languages)
- An on-line Encyclopaedia of Medical Physics (with 3000 entries/articles and over 2500 images and diagrams)
- A number of MSc courses in Medical Physics in Europe, Asia and Latin America

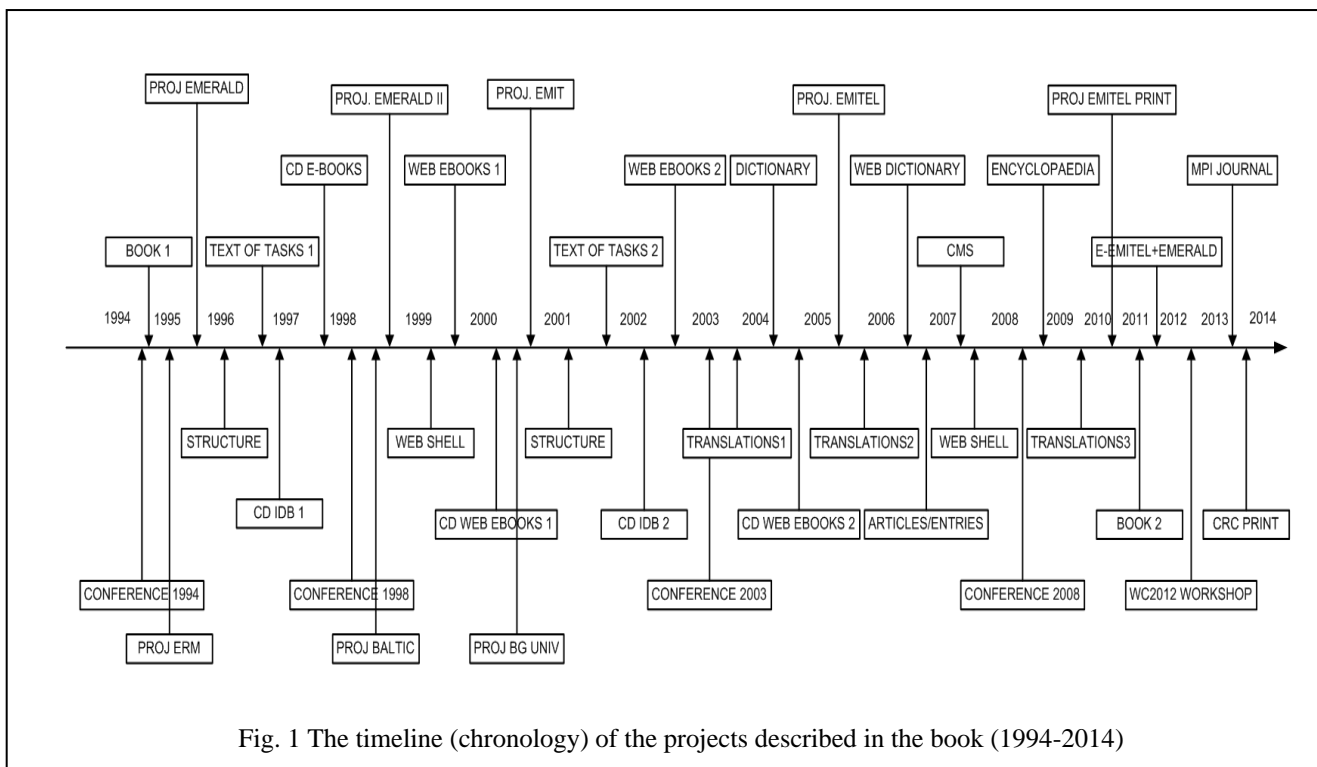


Fig. 1 The timeline (chronology) of the projects described in the book (1994-2014)

Although the book has a specific scientific background and approach, it also presents an example of successful international team work. To emphasise this angle of the collaboration the book describes the comradeship and communications between the team members, all of whom have worked on the projects mainly during their free time. The described projects generated more than a hundred publications and presentations, which could form a separate index, but the book aims to focus on the working methods, outcomes and impact of the projects.

III. IMPACT

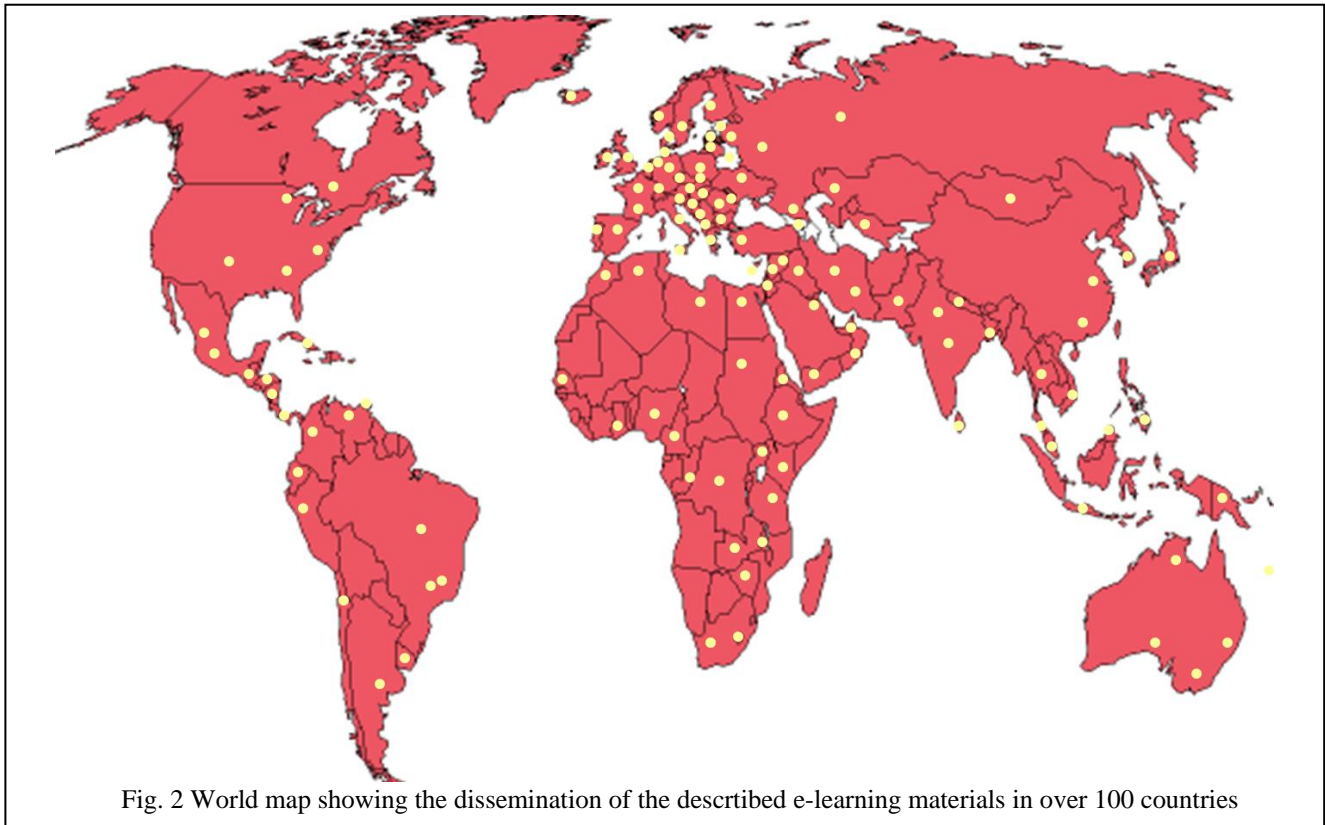
Currently thousands of colleagues from all over the world are regularly using the pioneering educational web sites hosting the described e-learning materials (Fig.2). Other teams and projects (also briefly described in the book) developed and presented additional e-learning materials, web sites, simulations and methods. All these, often free and highly effective teaching materials, helped enormously the global development of the profession, especially in the developing countries. As per the IOMP data, during the first 30 years of its formation (1963) the number of medical physicists globally increased with 6,000 (c. 2,000 per decade), while at the next 20 years (1995-2015) it increased with almost 8,000 (c. 4,000 per decade). This significant growth was underpinned by various education and training activities, including the e-learning developed by the projects described in the book. The success and global impact of these projects was the reason for the inaugural award for education of the European Union – the Leonardo da Vinci Award, which the described projects received in 2004.

For all members of these projects, and indeed for the whole profession, this high recognition was extremely important, as it was also a boost for the visibility of the importance of medical physics in contemporary healthcare.

The book also shows an example of continued success in international collaboration. The first project EMERALD, described in the book, was initiated in 1994 by a small enthusiastic team of about 15 ‘pioneers’, but after 10 years the final project EMITEL attracted some 300 specialists from 36 countries, making it the largest international project in the profession. Altogether, the projects described in the book attracted about 400 participants, contributors and supporters. The results achieved could not have been possible without the hard work and ideas of all these colleagues. The book is dedicated to all project contributors and supporters.

The book includes the following main chapters:

- 1.The Medical Physics Education and Training Conference, Budapest 1994;
- 2.EMERALD Project - the Development of the First Medical Physics e-learning Materials;
- 3.EMERALD II Project – the First Medical Physics Educational Web Site;
- 4.EC TEMPUS projects in Bulgaria and the Baltic States;
- 5.EMIT Project – EMERALD Continuation and Medical Physics Dictionary;
- 6.Thesaurus and Multilingual Dictionary Development;
- 7.Other Medical Physics e-learning Projects;
- 8.EMITEL Project – the Encyclopaedia of Medical Physics;



- 9. Organisation and Development of the Encyclopaedia;
- 10. Post-EMITEL Activities.

The chapters describing projects EMIT and EMITEL, as well as the related chapters 6 and 8 include specific methodology for development and organization of a Dictionary and Encyclopaedia – activities which can be of use in various professions.

IV. CONCLUSION

The Conclusion of the book underlines the pioneering role of medical physics for the development and introduction of e-learning in the teaching process. It also lists potential areas of development of e-learning, including:

- The need of stable electronic format, which will keep unchanged the product of the author (i.e. format independent of software version changes);
- The need of using effective e-learning platform, which main function is the delivery of knowledge (independent of proprietary templates and current graphic design);
- The need of use of e-learning platforms allowing easy update – essential for dynamic professions such as medical physics;

- The threat of shortened longevity of some e-learning products and specially computer simulations and the need of using user-friendly software shells;
- The necessity of recognition of all e-learning development process as *bona fide* research;
- The necessity of a forum for quick exchange of information about new e-learning products (a function served by the Journal *Medical Physics International*).

The e-book lists all contributors to the described projects, the Medical Physics Dictionary and the Encyclopaedia of Medical Physics.

All materials and e-books described in the book are available at: www.emerald2.eu & www.emitel2.eu

The e-book can be downloaded free from the web site:
http://www.emerald2.eu/mep_15.html

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