



Contents lists available at ScienceDirect

Clinical and Translational Radiation Oncology

journal homepage: www.elsevier.com/locate/ctro

Perspectives on medical education in radiation oncology and the role of the ESTRO School

Jesper Grau Eriksen^{a,*}, Michelle Leech^b, Kim Benstead^c, Christine Verfaillie^d

^a Dept. of Oncology, Odense University Hospital, Odense, Denmark

^b Discipline of Radiation Therapy, School of Medicine, Trinity Centre for Health Sciences, St. James' Hospital, Dublin 8, Ireland

^c Department of Oncology, Gloucestershire Oncology Centre, Gloucestershire, United Kingdom

^d ESTRO Office, Brussels, Belgium

ARTICLE INFO

Article history:

Received 29 September 2016

Revised 18 October 2016

Accepted 19 October 2016

Available online xxxxx

Keywords:

Radiation oncology

Medical education

Blended learning

ESTRO

ABSTRACT

Radiation oncology is a medical specialty not just delivering ionizing radiation to cancer patients but also participating as an important partner in the care of the patient from diagnosis to cure, follow up or end of life. The specialty is rapidly evolving in a multi- and interdisciplinary setting as multimodality treatment is becoming frequent. This requires that the medical undergraduate and postgraduate training evolve to these changes. The ESTRO School has for more than 30 years offered postgraduate training courses in and outside Europe and strives to develop its services to accommodate the educational needs of a specialty in constant development. Some of these developments are described in the present paper.

© 2016 Published by Elsevier Ireland Ltd on behalf of European Society for Radiotherapy and Oncology. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Radiation oncology in Europe

“Radiotherapy” is the official term for the non-surgical medical specialty that treats patients with ionizing radiation [1]. However, in most countries in Europe as well as abroad, the term “radiation oncology” is more and more frequently used, also as the official term for the specialty in the country [1]. This reflects that radiation oncology is much more than just delivering ionizing radiation to the patient and that the specialty has become comprehensive, taking care of the patient from diagnosis, during treatment to follow-up and end-of-life situations involving multiple specialties and modalities. This transition is in different phases around Europe and in some countries, clinical oncology has become the general rule whereas in other countries the different specialties are still more separated. Regardless of that, radiation oncology is an important partner throughout the patient's cancer-life and an important partner in the multidisciplinary scenario.

Coupled with this, radiation oncology is becoming increasingly specialized with more and more of our colleagues becoming sub-specialized in certain tumor sites. This calls for bigger institutions or collaboration between hospitals and even across borders. This is an evolution which is supported by the European Union (EU), with

the European Reference Network for rare cancers being one of the examples. This development is not just driven by the profession but also from the patient side, with patients behaving more like consumers, searching for the best option for their situation and being aware of the qualifications of the doctor treating them [2]. This situation has been present for years in the US medical system but is now also emerging in Europe.

All the above mentioned factors, as well as the need for reducing the waiting times from diagnosis to start of treatment and an increasing frequent involvement of several treatment-modalities, calls for a higher degree of collaboration within and between specialties. The multidisciplinary tumor boards seems to be an obvious way to meet these demands and have become more common in cancer institutions across Europe [3].

The European Union also aims for the free movement of healthcare professionals across borders in Europe and with the new Persons Qualifications Directive this will become easier than ever [4]. This means that the differences in the training of doctors, nurses, RTTs and medical physicists across Europe have become more visible and that the need for homogeneity in their training is evident for meeting the vision of one free work market in Europe.

Challenges for medical education

One of the most important steps for adapting the education to the needs of the future has been to realize that healthcare

* Corresponding author at: Dept. of Oncology, Odense University Hospital, DK-5000 Odense C, Denmark.

E-mail address: jesper@oncology.au.dk (J.G. Eriksen).

<http://dx.doi.org/10.1016/j.ctro.2016.10.001>

2405-6308/© 2016 Published by Elsevier Ireland Ltd on behalf of European Society for Radiotherapy and Oncology.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

professionals in radiation oncology or clinical oncology cannot just be medical experts but also need to be good communicators, collaborators, researchers (or at least have a certain academic approach to the clinic), leaders, health advocates and first of all professionals (Fig. 1) [5]. This requires that training in radiation oncology is more than obtaining medical knowledge but also, acquisition of skills and development of a professional attitude. In tandem with this, training has to be multidisciplinary oriented both in the pre- and the postgraduate situation.

All these changes imply that the philosophy at medical schools and especially in the postgraduate residency training must adapt to be more comprehensive to include several other competencies than the medical expert. There is also a need for specifically making the postgraduate training multimodality oriented and having common European minimum training requirements necessary for facilitating the free movement of healthcare professionals in Europe.

For the individual institutions, this is a not an irrelevant and negligible task and collaboration is necessary for obtaining success. Furthermore, a key strategy for moving medical education forward is training of faculties at local institutions to teach new skills and capabilities and to acknowledge that technology has the potential to change how training is delivered, documented, and assessed.

The role of ESTRO School

ESTRO Educational Committee and the ESTRO School have been aware of and taken active part in these developments over the years [6]. The School aims to provide a range of opportunities that support postgraduate training and continuous medical education within all fields of oncology that reflects all seven competencies as described in the CanMEDS framework (Fig. 1) [5].

ESTRO focuses its main educational activities within six defined working groups:

1. Live courses
2. Blended learning and online learning
3. Development of curricula and assessment
4. Optimization of the learning process
5. Facilitation of education in other institutions
6. Educational activities worldwide

ESTRO School delivers educational activities not just in Europe but also internationally and the sixth working group emphasizes that the ESTRO School acknowledges that there are local, social and cultural differences in education that are important to consider for delivering education in the most optimal way.

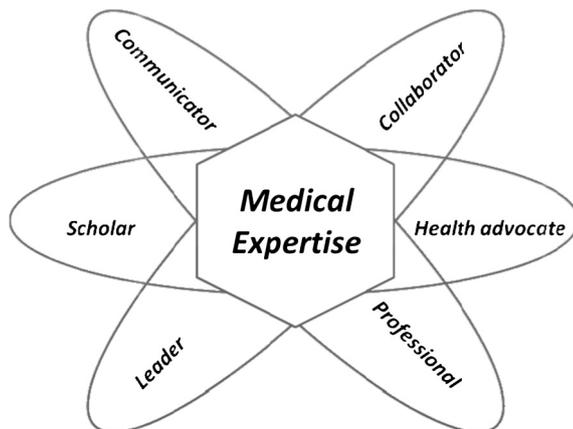


Fig. 1. The CanMEDS 2015 seven competencies.

Live courses

Since the first ESTRO course in 1985 in Leuven, Belgium, ESTRO School has gradually developed its course activities to be as comprehensive as possible within the competency of the medical expert and research. Today, 40 basic or advanced courses are available on an annual or biannual plan. They cover multi- and interdisciplinary general or site-specific cancer treatment as well as radiotherapy treatment, planning and delivery – both as external beam radiotherapy and brachytherapy. Courses are also available in radiobiology and cancer biology, imaging, research and risk management. Courses are organized in a way that they can be of interest for both trainees and specialists in the field who wish to be refreshed on a specific topic. Most of the courses are well suited to be an add-on to the national or institutional training courses for residents. The aim of the School is in the near future to cover the leadership competences and communication skills as well.

This year the School has also expanded the activities with two undergraduate courses, one organized in collaboration with the European School of Oncology (ESO) and European Society of Surgical Oncology (ESSO) and one in collaboration with the radiotherapy departments in Groningen, The Netherlands and Vienna, Austria. The School acknowledges that radiotherapy only has minimal space in most medical school curricula and that awareness of the specialty has to be boosted by organizations outside the university world.

Blended learning and online learning

In blended or hybrid learning, traditional 'face to face' teaching is combined with online delivery [7]. In fully online learning, all materials, including instruction by faculty and interaction between faculty and participant and peer interactions take part completely in the online environment [8]. Online learning has been made possible with the development of Web 2.0 tools, which provide a range of features that support collaborative creation, sharing and linking of multimedia content among faculty and participants. Such tools include wikis, virtual worlds, social networks, online games, blogs and discussion fora [9].

Access to continuing medical education (CME) and continuing professional and personal development (CPPD) is a fundamental aspect of the ESTRO Vision (Vision 1.3) [10] and in order to bring this vision to fruition, ESTRO has in recent times focused on equality and ease of access to such education across Europe and beyond. The use of the Fellowship in Anatomic delineation and CONtouring (FALCON) tool at the ESTRO School has seen an exponential growth in the number of blended and online learning opportunities for radiation oncology trainees in recent years. The integration of FALCON at live courses increased from a single course in 2010 to 14 courses in 2016. The pedagogic approach for this blended delivery is for students to prepare pre-defined cases ahead of the 'face to face' teaching component and then to attempt the cases once again at the live teaching course when the expert content has been delivered. This collegial and learner-centered approach is indicative of the paradigm shift in education that has occurred in the past decade, where productive learning, constructivism, facilitation of learning and outcomes-based education have superseded the historic reproductive learning and behaviorist-centered models of education where the focus was on the faculty and content only [11].

Such was the positive impact of the blended learning approach using FALCON that full online workshops commenced in 2011 and have increased to 6 per year by 2016. The addition of full online instruction was not to replace the blended approach but rather to increase ease of access to trainees who wished to undertake

education in delineation, but for geographic, financial or other logistical reasons could not commit to attendance at a live ESTRO course.

Online teaching and learning is not without its challenges. Learners expect robust networks, equality of access, a specific level of technology and the ability to use their own devices in order to access the online material. Similarly, faculty expect a certain level of digital literacy from participants; that is the know-how to use technology and which functions and forms are the most appropriate for the purpose of the course [12]. For ESTRO faculty, teaching in the online environment differs significantly from the traditional method of delivery as they change from being lecturer to facilitator, from provider of answers to expert questioner and from being solely in control of the teaching environment to sharing this control with online learners [13].

With over 4000 participants now having received CME/CPD education using FALCON through these blended and online delivery methods, this challenge has been met by both participants and faculty and quantifiable improvements in knowledge of participants has been reported [14].

In 2013, ESTRO introduced the Dynamic Online Virtual ESTRO (DOVE) tool, which houses over 14,000 scientific and educational publications. This repository of learning is essentially an online library of peer-reviewed, up to date information in the field of radiation oncology and is a considerable resource for ESTRO members.

In the coming years, the ESTRO School will continue to invest in the further development of blended and online delivery methods with the integration of a full virtual learning environment (VLE) and continued and novel development of both FALCON and DOVE. In this way, we will realize this component of the ESTRO Vision.

Development of curricula and assessment

ESTRO first proposed “a curriculum for the theoretical education in radiation oncology in Europe” [15] in 1991. The third version proposed in 2011 [5], allowed, not only for the developments of radiation oncology but also of the concept of competency based education with its emphasis on what the doctor was able to do rather than a concentration on purely theoretical knowledge. The roles of a doctor identified by CanMEDS physician competency framework [16] were made explicit in this curriculum as was the need to assess competency in these roles in the workplace. Advances in both tumor biology and radiotherapy planning have resulted in a requirement for a further revision. It is intended that work should begin on this in 2017. The implications of the role of leader identified in the latest version of CANMEDS [17] has been explored in a Delphi survey by the Global Radiotherapy Collaboration in Education group (GRaCE) [18] - an international collaboration of people and organizations interested in medical education in radiation oncology. The results of this will be valuable in revising the curriculum. As training programs design pathways for progression based on milestones or entrustable professional activities [19] it will be important to share assessment methodologies ranging from forms for face to face work place based assessments to web-based radiotherapy planning assessments.

Optimization of the teaching and learning process

All live courses of the ESTRO School are accredited by the Accreditation Council of Oncology in Europe (ACOE). ACOE accreditation is endorsed by EACCME, the European Accreditation Council for Continuous Medical Education - an institution of the UEMS and by the American Medical Association (AMA). However, the ESTRO School strives to promote excellence in education that goes beyond formal accreditation.

A recent self-evaluation of the ESTRO School according to the internationally accepted standards of the World Federation for post-graduate Medical Education (WFME) has identified how the educational expertise in the School can be further improved [20]. To that aim a pedagogy program has been created that will support the School's faculties in their current educational activities and in the development of new approaches to teaching and learning methods, assessment techniques and educational management, in response to advances in medicine, changes in healthcare delivery and patient demands and new educational thinking and techniques.

The new ESTRO pedagogy program will put major effort to support ESTRO School teachers in developing teaching and coaching skills in smaller and larger audience sessions. Teaching is changing rapidly in the twenty-first century and educators are asked to function in a variety of contexts - face-to-face, self-directed, blended and distance learning modes. Dedicated Workshops preceding the ESTRO annual meeting will continue to be conducted and further resources will be made available to ESTRO teachers to facilitate the delivery of active, effective and innovative teaching. Implementing these changes in medical education will be a major challenge for the faculties and facilitating faculty performance will be another major objective of the ESTRO School in the coming years [21].

To improve the quality of the teaching and learning, assessment of these processes is capital. Assessment is needed for improving the quality and reaches of teaching, and improves students' learning outcomes [22]. In the future, the School wants to implement more extensive assessment: summative assessment (before, during, at the end of the course and six months after the end of courses) but especially also formative assessment to monitor student learning and to provide ongoing feedback that can be used by instructors to improve their teaching and by students to improve their learning. The introduction of blended learning will necessitate an in-depth evaluation of the effect the use of technology will have on the way teachers teach and how participants learn.

In higher education there is growing interest in 'student' engagement, in the 'student voice' and in faculties working in partnership with course participants to deliver the education programme and to facilitate change. The ESTRO School plans to actively integrate trainees in the management of the School by having them represented at the Education Council and engaged in the evaluation of the curriculum and teaching and learning processes.

Facilitation of education at other institutions

It is widely accepted that rotation between institutions is preferable during residency training. A recent survey performed by the UEMS Multidisciplinary Joint Committee in Oncology showed that this is also mandatory in the majority of training programs in Europe. ESTRO School does not have the financial possibilities to organize rotations but the School finances focused stays at foreign institutions for learning more about a specific topic for a period of up to three weeks. Every year the School finances 20–30 of these mobility grants that can be applied for on www.es-tro.org under the School section.

Conclusion

Radiation oncology is a medical specialty in constant development - structurally as well as scientifically - and so is the need for medical training and especially postgraduate medical education. The ESTRO School strives to evolve accordingly to the

developments within the field and aims to be at the forefront with attractive educational offers that can support doctors, medical physicists, radiation therapists (RTTs) and radiobiologists in their professional development and careers.

Conflict of interest

None declared.

References

- [1] Directive 2005/36/EC of the European Parliament and of the Council of 7 September 2005 on the recognition of professional qualifications. L 255 ed. 2005. p. 22–142.
- [2] Butcher L. Are you connected to the revolution? Six ways the health care consumer will change—is changing—our world. *Hosp Health Netw* 2015;89(11):28–33.
- [3] Toustrup K, Lambertsen K, Birke-Sorensen H, Ulhoi B, Sorensen L, Grau C. Reduction in waiting time for diagnosis and treatment of head and neck cancer - a fast track study. *Acta Oncol* 2011;50(5):636–41.
- [4] Directive 2013/55/EU of the European Parliament and of the Council of 20 November 2013 amending Directive 2005/36/EC on the recognition of professional qualifications and Regulation (EU) No 1024/2012 on administrative cooperation through the Internal Market Information System ('the IMI Regulation'). L 354 ed. 2013. p. 132–9.
- [5] Eriksen JG, Beavis AW, Coffey MA, Leer JW, Magrini SM, Benstead K, et al. The updated ESTRO core curricula 2011 for clinicians, medical physicists and RTTs in radiotherapy/radiation oncology. *Radiother Oncol* 2012;103(1):103–8.
- [6] Potter R, Eriksen JG, Beavis AW, Coffey M, Verfaillie C, Leer JW, et al. Competencies in radiation oncology: a new approach for education and training of professionals for Radiotherapy and Oncology in Europe. *Radiother Oncol* 2012;103(1):1–4.
- [7] Poon J. Blended Learning: an institutional approach for enhancing students' learning experience. *J Online Teach Learn* 2013;9:2.
- [8] Boettcher J, Conrad R. The online teaching survival guide: simple and practical pedagogical tips (1 ed.). San Francisco: Jossey Bass; 2010.
- [9] Conole G, Alevizou P. A literature review of the use of Web 2.0 tools in Higher Education. A report commissioned by the Higher Education Academy 2010. Milton Keynes: Open University.
- [10] Valentini V, Bourhis J, Hollywood D. ESTRO 2012 strategy meeting: vision for radiation oncology. *Radiother Oncol* 2012;103(1):99–102.
- [11] Brown T. Beyond constructivism: exploring future learning paradigms. *Education Today*; 2005. Issue 2.
- [12] Greenhow C, Robella B, Hughes J. Learning, teaching, and scholarship in a digital age Web 2.0 and classroom research: what path should we take now? *Edu Res* 2009;38(4):246–59.
- [13] Lewis D, Allan A. Virtual learning communities: A guide for practitioners. Maidenhead: Open University Press, McGraw-Hill Education; 2005.
- [14] Eriksen JG, Salembier C, Rivera S, De Bari B, Berger D, Mantello G, et al. Four years with FALCON - a ESTRO educational project: achievements and perspectives. *Radiother Oncol* 2014;112(1):145–9.
- [15] Leer JW, Overgaard J, Heeren G. The European core curriculum on radiotherapy. *Radiother Oncol* 1991;22:153–5.
- [16] CanMEDS 2000. Extract from the CanMEDS 2000 project societal needs working group report. *Med Teach* 2000;22:549–54.
- [17] Frank JR, Snell L, Sherbine J, editors. CanMEDS 2015 Physician Competency Framework. Ottawa: Royal College of Physicians and Surgeons of Canada; 2015.
- [18] Turner S, Eriksen JG, Trotter T, Verfaillie C, Benstead K, Giuliani M, et al. Establishing a Global Radiation Oncology Collaboration in Education (GRaCE): objectives and priorities. *Radiother Oncol* 2015;117(1):188–92.
- [19] ten Cat Ollee. Nuts and bolts of entrustable professional activities. *J Grad Med Edu* 2013;5(1):157–8.
- [20] Postgraduate Medical Education. WFME Global Standards for Quality Improvement. Denmark: WFME Office, University of Copenhagen; 2003.
- [21] Steinert Y. Faculty Development in the Health City of Copenhagen Professions: A Focus on Research and Practice. NY: Springer; 2014.
- [22] Epstein R. Assessment in medical education. *NEJM* 2013;356:387–96.