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Sharing Knowledge and Integrated Information in Therapeutic Radiological Physics

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Abstract

In this paper a framework for Sharing Knowledge and Integrated Information in Radiotherapy (SKIIR) for medical physicists involved in Therapeutic Radiological Physics is discussed. The proposed SKIIR is mainly designed for sharing knowledge based on specific cases of treating patients with cancer. Integrated Information and Knowledge are captured for storing knowledge and medical information related to the specific cases of interest, in any useful form and format, for the medical physicists. Various patient cases' descriptions and related documents of primary interest for the medical physicists are stored and organized for future use in a multimedia library including short descriptions, radiotherapy planning, ultrasound, CT and MRI images, statistical information, bibliography, discharge letters, etc. Codification of knowledge and preservation of anonymity is also discussed.

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Keywords: Knowledge Management, Therapeutic Radiological Physics, Codification, Anonymity

1. Introduction

Information and Knowledge have always been important assets for health organizations. There is a significant difference between them: Information could be seen as the interpreted data and knowledge as information to be transformed into capability for effective action. Therefore, Knowledge represents the purposes for which we use information and 'another way of looking at this is to say that information is data in context, while knowledge is

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information in context' (Gunderman and Chan, 2003). By 'knowledge' organizations generally imply codified information with a high proportion of human value-added, including insight, interpretation, context, experience, and so forth. It could be seen as a critical factor, empowering the organization with the ability to sustain competitive advantage. There are two types of knowledge: Tacit knowledge is embedded in the human brain and cannot be expressed, easily. Explicit knowledge can be more easily captured and codified into rules and databases. Hansen et al. believe that the idea that 'knowledge is power' should be taken further to mean that 'knowledge sharing is power' (Hansen, 1999).

Gunderman and Chan believe that in a knowledge-generating environment such as radiotherapy, 'physicists function not in series but in parallel and the quantity and quality of their output is dependent upon interactions between the group's members' (Gunderman and Chan, 2003). Armoogum and Buchgeister investigate the applicability of the concept of a Radiotherapy Physics Community of Practice (CoP) (Armoogum and Buchgeister, 2010).

1.1. Sharing Knowledge and Integrated Information in Therapeutic Radiological Physics – The role of the medical physicists

The European Federation of Organisations in Medical Physics (EFOMP) founded in 1980 serves as an umbrella organisation to National Medical Physics Organisations (NMPOs) in Europe currently including 35 members and 3 affiliated members. Hellenic Association of Medical Physicists (HAMP) is the National Member Organisation for Greece. The definition of the Medical Physics given by the EFOMP is the following:

'Medical Physics is the application of physics to healthcare; using physics for (various applications like) patient imaging, measurement and treatment. Medical physicists are graduate scientists, normally holding post-graduate qualifications, who work in many different areas of healthcare managing and delivering services and carrying out research and development. The main areas of Medical Physics include: Clinical Measurement, Diagnostic Radiology, Equipment Management, Computing, Medical Electronics, Nuclear Medicine, Radiation Protection, Radiotherapy Physics, Magnetic Resonance Imaging, Ultrasound and Non-ionising Radiation' (EFOMP, 2013a).

Malaga Declaration describes the EFOMP's position on Medical Physics and the Medical Physics Profession in the European Union (EFOMP, 2006).

In the EFOMP's Policy Statement for the Medical Physics Education and Training in Europe and the qualifications of the Medical Physicist we can read the following: 'Holding a university Master's Degree in Medical Physics is not a sufficient qualification to work as a Medical Physicist in a hospital environment. To manage patients without supervision, EFOMP recommends a second part in the post-graduate training: at least 2 years' training experience on the job. Only after completion of this training can a physicist be considered a Medical Physicist and able to work independently as a Qualified Medical Physicist. (QMP).The on-the-job training is essential to achieve the competencies to work as QMP' (EFOMP, 2013b).

It is also worth mentioning that EFOMP has an agreement with the IAEA for the reviewing and the endorsement of documents produced by the IAEA, that fall within the scope of EFOMP.

1.2. Information and Knowledge Management

Information and Knowledge Management (I&KM) is a discipline that enables management of data, information, processes, functions, procedures, people and assets within an organization. Knowledge Management (KM) has been transformed to a core function, among top-level health companies and organizations. KM largely involves new applications based on the existing IT infrastructure. In this respect, the objectives of I&KM can be achieved by various approaches based on: techniques and tools building technical infrastructure such as information and knowledge repositories, use of classification schemes (e.g. ICD) and intelligent search that utilize ontologies, personalization techniques for dissemination of information and knowledge, tools for communicating patients' cases, and so forth, structuring a learning organization, establishing I&KM processes, and a framework-basis for change management. Key benefits include: centralized design of organization's rules, data and knowledge bases, improved decision making, better services, enhanced collaboration and communication, improved efficiency of