

Background

Due to the typical characteristics of ionising radiation, the radiological risk is a very specific one. Risk governance has to take into account as well scientific uncertainties related to biological effects, the distribution of benefits and burdens as well as different perceptions on the risk and on the usefulness of the specific applications of ionising radiation as such. It is not always easy for theorists and practitioners with a certain responsibility to grasp all the facets and nuances of this risk and of the social dynamics in face of it.

As well the nuclear worker, the medical doctor as the policy maker or any other person working within an application field of ionising radiation could face situations requiring action where, apparently, the available factual knowledge does not lead unambiguously to a way forward that is 'justified enough' in relation to the potential risk. And if the solution would be justified for him/her, it could be that others involved have different opinions. Having this in mind, it is clear that education and training in RP - seen as a continuous learning process - should elaborate on as well the socio-technical complexity of 'risk assessment' as on the conditions and methodologies to 'find a way out'.

Objectives

This research aims at developing an argumentation for an approach to education and training in radiological protection (RP) and ALARA practice that is broader than the 'classical' acquiring of factual knowledge related to physics and regulation. As for most other areas where applications of a technology are connected to a certain risk, the complexity of applications of radioactivity and nuclear technology has generally technical as well as social dimensions.

Principal results

Rather than dwelling on methodologies for the organisation of this 'broader' education and training, the project analyses elements of complex problem solving and makes a link to ethical aspects in order to found the argumentation for this broader approach. We highlight how the key ideas related to complex problem solving have been translated already into specific methodologies in socio-political science and epistemology.

Based on the philosophical reasoning and on the related (existing) methodologies, we then argue that the theory and practice of RP could and should develop as a systematic and interactive practice of a diversity of disciplines and skills, and that RP, in this sense, has the potential to serve as a key example of a transdisciplinary interaction of science with society. In this, we state that practitioners should be stimulated to develop (what we call) an 'applied ethical sense', and that it is of key importance to see 'ethics' in this context as 'ethics of interactions', rather than as a set of universally applicable moral guidelines.

We also look at the specific issue of justification and optimisation in the field of applications of low level ionising radiation, and shed the light on a new approach to optimisation and on some challenges within the scientific community and the broader society.

As an interaction of theory with practice, SCK•CEN developed some applications of the outlined transdisciplinary approach throughout the recent years. The PISA project has been a learning experience in integrating social sciences into nuclear research, with a focus on the direct involvement of various academic disciplines and stakeholders from civil society in the research and accompanying reflection group activities.

Future work

The work within the PISA project continues and the cross-fertilisation with the activities within the Communication, Education and Knowledge Management expertise group of the SCK•CEN will lead to more in-house reflections and activities on 'expert culture'.

In addition, we will start a pilot 'teaching the teacher' project with secondary schools, looking at how the standard education programme can integrate a pluralistic approach to complex technical issues such as the applications of radioactivity. The aim is to identify gaps in the existing curriculum and to find out how to establish links between specific courses and how to organise 'cross-over' sessions in practice.

Finally, from out of SCK•CEN, CEK will continue to foster this transdisciplinary approach to E&T also in the various policy networks, organisations and institutes that deal directly or indirectly with E&T in radiological protection and nuclear engineering.

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Main reference

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Gaston Meskens, '*Ethical aspects of applications of radioactivity and nuclear technology*', Invited lecture, SPERANSA course 2007, Technical University of Prague.