

TEN YEARS OF EXPERIENCE FEEDBACK IN DISSEMINATION OF RADIATION PROTECTION CULTURE: 1,500 HIGH SCHOOL STUDENTS INVOLVED IN RADIATION PROTECTION ACTIONS

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For the tenth consecutive year, IRSN, CEPN, the scientific culture center of Franche Comté, INSTN and ASN offer to French and foreign high school students (approx. 16 to 18 year old) to participate in international workshops named "Radiation Protection Workshop". More than 1,500 students have participated and contributed to the spread of radiation protection culture.

These workshops, led by professors in partnership with radiation protection experts, academics and researchers in scientific disciplines are intended to engage students, on a voluntary basis, in multidisciplinary activities related to radiation protection practice.

International meetings are organized at the end of the second quarter of the school year to allow students who participated in the workshops to present their work and interact with other students and with radiation protection professionals.

During the 2015-2016 school year, more than 140 students were involved in this action coming from 16 high schools: France, Germany, Belarus, Ukraine, Morocco, Moldavia and recently involved, a high school from Fukushima (Japan) in close partnership with about thirty radiation protection experts.

For the tenth edition to be held at the INSTN in Saclay from 20th to 22th March, in addition to the countries historically involved, Colombia joins the workshop.

Throughout the academic year, students under the guidance of their teachers and with the assistance of radiation protection experts carry out work on various topics concerning the practical implementation of radiation protection. These annual international meetings are organized to enable everyone - student, teacher and expert to present their work and exchange information and opinions with other students and professionals in radiation protection.

This type of action allows young people to become informed citizens being able to make their own judgement about key issues related to radiation protection, such as:

- What are the different types and levels of exposure?
- What are the living conditions in the contaminated territories (Belarus, Ukraine, Japan)?
- Where is the radioactivity and how to measure it?
- What are the health effects of ionizing radiation and how to assess risks at low doses?
- What are the means of protection against exposure?

Depending on local interest, some schools have decided to study the natural radioactivity, radiation protection in the medical field, monitoring around nuclear power plants or living condition in contaminated territories due to an accident (Chernobyl and Fukushima), favoring a multi-disciplinary approach.

In addition to oral presentations in French during the plenary sessions, one afternoon is devoted to presenting the work carried out throughout the year, by means of workshops and posters.

Another afternoon is dedicated for visiting scientific installations related to radiation protection, energy or scientific research.

The growing success of this action to spread the radiation protection culture, forces the organizers to consider all arrangements to ensure the sustainability of the "Radiation Protection Workshop".

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Introduction

CEPN, ASN, IRSN, CEA / INSTN, the Science Pavilion (CCSTI) and SFRP offer to French and foreign high schools to be mobilized for the "International High school meeting on Radiation Protection" also called "Radiation Protection workshops", as every year since 2008.

For the tenth consecutive year, the radiation protection workshops allow high-school students around the world to share their work and to visit research facilities related to radiation protection.

This year, this event were organized at INSTN in Saclay

Since the beginning of the adventure, 1,500 high school students were involved in this educational activity and acquired the elements of radiation protection culture.

For several years, students from France, Germany, Belarus, Moldova and Ukraine were involved. This year, thanks to the support of the Franco-Japanese Sasakawa Foundation, a delegation of high school students in Fukushima participated and worked on the issue of evacuation of people and their return to the territories in Fukushima.

Finally, a delegation of students from a high school in Bogota, Colombia participated for the first time in this international event.

Workshop Description

The workshops are designed to engage high school students (16 to 18 years old) in activities concerning the practical radiological culture, key element of the radiation protection of workers, public and patients.

The workshops of radiation protection are based on key points that structure and guarantee the quality of this unique educational event in France:

- the importance of a multidisciplinary approach, where topics from engineering domain and health coexist,
- student involvement on a voluntary basis and requiring substantial work from students,
- identifying scientific elements which are discussed in the workshops through the transdisciplinary themes of radiation protection
- the organization of pathway in each school in order to develop a citizen questioning process on concrete issues of radiation protection, expanding the strictly scientific approaches of problems addressed and allowing students to study topics following technical, scientific, ethical, sociological, ecological ... perspectives.

General objectives

Workshops for Radiation Protection are part of a spread out process of the radiation protection culture among young students studying mainly science subjects (but not only).

This initiative aims to bring social awareness through an appropriation of scientific and social elements associated with ionizing radiation in the environment.

Radiation protection workshops also contribute to promote scientific and technical culture in high school which knows disaffection unfortunately.

This educational activity also enables discovery of the professional world through technical visits and discussions with experts from the field.

Methodological approach

To engage high students in activities to develop practical radiation culture at school, a multidisciplinary approach is implemented by the teaching staff of each school. Teachers involved teach physics, chemistry, mathematics, science and life of the earth, letters, philosophy, history, geography, arts, economics and social sciences, and finally foreign language.

Partnerships are established for each school with radiation protection experts (universities, expert bodies, research organizations ...) according to the work program adopted by the students.

Finally, the steering committee of these Radiation Protection workshops, develops and monitors the work of the involved schools throughout the year.

These workshops start at the beginning of the school year and include a theoretical classroom provided by the teacher with additional lectures given by experts combined with a part with practical experiences. Students have the opportunity to handle detection and measuring devices, visit technical facilities and conduct experiments.

In March of each year, international meeting is organized to allow students to present their work in plenary sessions and share with other students and radiation protection professionals. This event represents the apogee of the work done during the school year. During 3 days, nearly 25 themes were presented in French, except for high school students in Fukushima and Bogota, who presented in English.

One afternoon was devoted to technical visits and students discovered some installations at Saclay nuclear site such as DOSEO platform, the EL3 reactor, the virtual room VERT, the laboratory for liquid scintillation and the SOFIA simulator (Fontenay-aux-Roses).

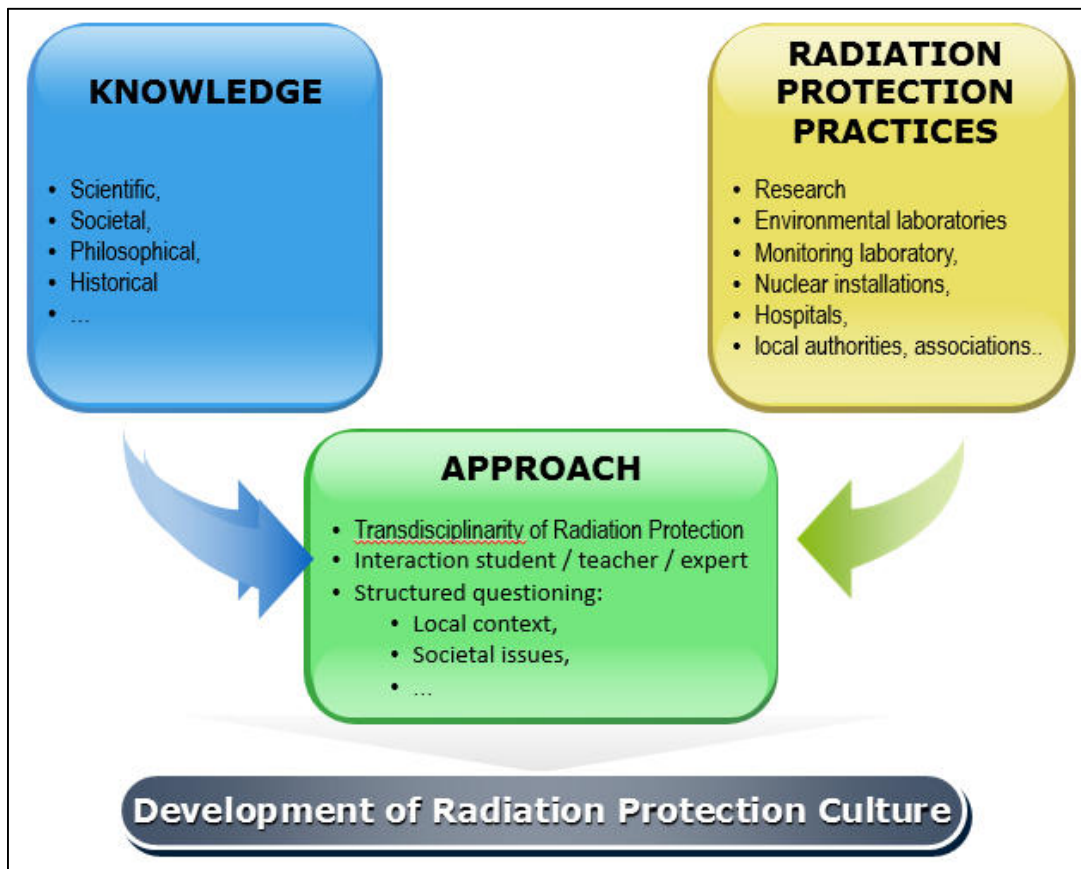


Fig 1. General methodological approach of Radiation Protection Workshops

The topics

Because of transdisciplinarity of radiation protection, the choice of topics is vast. For example, this year, the studied topics were:

- The question of the evacuation of people and their return to the territories in Fukushima
- Radiation protection of staff working in nuclear power plant
- Post-accident iodine dosage
- The dismantling of the Fukushima Daiichi plant
- Radioactivity and medical diagnosis
- Highlighting different types of radiation
- Radiation therapy: benefits and risks
- Cell therapy and stem cells
- Radiation protection at the museum
- Radioactivity and risk
- Application for authorization to possess and use radionuclides unsealed sources for medical applications
- The protection of the pregnant woman and fetus during medical examination or treatment
- Radiography and pediatric scanner: harmless examinations for children?
- Radiation protection in the operating room associated with the Marie Curie history of radiography
- Evolution of internal contamination of the people affected by the Chernobyl accident

- Thyroid problems in Fukushima
- The new sarcophagus of Chernobyl
- Uranium: from origine to extraction
- The rehabilitation and monitoring of former uranium mines of Limousin region
- Disposal, nuclear waste management and the scenario of a possible exit from nuclear
- What do we make of our radioactive waste?
- ANDRA storage sites in Aube
- The CIGEO project - CMHM center
- Philosophical sketches
- Radiation protection in Colombia
- Radiation protection for pilots, crew and passengers during air travel

Results

In addition to the work performed during the radiation protection workshops, some students were involved in measurement campaigns in four countries. They contributed to the writing of a scientific article in the Journal of Radiological Protection (J. Radiol. Prot. 36-2016, 49–66). The title is “Measurement and comparison of individual external doses of high-school students living in Japan, France, Poland and Belarus—the 'D-shuttle' project. A total of 215 people from 6 schools inside the Fukushima prefecture, 6 schools in other prefectures in Japan and 12 overseas areas.

The contribution of the students was effective and 130 co-authors signed this article downloaded 88733 times!

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Fig 2: article published in Journal of Radiological Protection

Conclusion

This unique action in France is assisted by organizations such as the regulatory body (ASN), the TSO (IRSN), the nuclear Education & Training institute (CEA / INSTN), the center of scientific culture (CSSTI), a protection assessment association in the nuclear field (CEPN) and the French radiation protection society (SFRP).

The radiation protection workshops allowed students to develop a practical culture of radiation protection. Through this experience, they have indeed been able to

- Acquire point of reference with respect to the radioactivity present in the environment and notions of the means of measurement
- Interpret external and internal exposure measurements and acquire key to understanding

- Understand the biological effects that can occur after exposure to ionizing radiation and the risk assessment at low doses
- Acquire notions on the protection of the environment and mankind from radioactivity
- Discuss issues related to protection against ionizing radiation.

The growing success of this work to spread the radiation protection culture, force the organizers to consider all arrangements to ensure the sustainability of the "Radiation Protection Workshop".