

Propositions of Nuclear Issue Education for Teachers and Students

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Besides renewable energy forms, the nuclear energy seems to be of the greatest importance now. Recently the nuclear technology has developed almost in all domains of human activity. Unfortunately, common knowledge about physical processes involved in the nuclear energetics and furthermore, about the specific, nuclear radiation effects on the living tissues, is still very poor among the secondary and university students. We can find proofs for this statement in everyday situations and in the literature [1,2,3]. Thus, we should take every opportunity to speak about the complex nuclear problems, and that much more of the school time should be spend on teaching radioactivity phenomenon. We should acquaint students both with benefits and risks of the nuclear energy applications. Knowledge is certainly the cheapest way to prevent any nuclear danger! Taking this into account we designed the proposition of projects aimed at increase of nuclear issue knowledge and awareness among teachers and students:

- Project RADONET.
- Computer aided investigations of radioactivity with the use of GM detector.
- Competition “Radioactive World”.
- Distance lecture on “Radioactivity Around Us”.

The main objective of project RADONET (RADON + NET) was concentrated on answering the question: Radon in our homes - is the risk acceptable? It was based on the concentration of radon investigations in indoor air, ground and drinking water and in the vicinity of TV and computer screens, made by the science teachers from Torun. In our opinion, the knowledge about radon and its health risk should be implemented to the interdisciplinary science education as early as possible. Thus, inspiring by English and Hungarian researchers [4,5] we propose the method of environmental education related to the radon issue. In collaboration with 35 science teachers from different regions of Poland educational research project RADONET for students was performed [6,7]. The concentration of radon was measured by the use of passive method (TASTRAK detectors). For communication of researchers, teachers and students as well for discussion of the obtained results e-mail, WWW pages, etc. were used. As the result we created the preliminary map of radon concentration in Poland made by students and we got the evidence that the increasing number of teacher and pupils wish to take a part in this kind of educational investigations.

Since the phenomenon of radioactivity was discovered by Henry Becquerel, Marie Curie-Sklodowska and Pierre Curie we know, that the “ionizing radiation” is around us. It can be the stream of particles of the distinct kind – alpha, beta, protons, ions, neutrons and stream of high energy - X or gamma rays. But, naturally some problems arise: where

does this radiation come from, how long does it live, is it dangerous to the human body, can we measure its amount and behaviour? In this paper we report our attempt to answer mainly the last question. For this purpose we designed and constructed computer controlled Geiger-Mueller counter with the dedicated software to measure ionising radiation intensity. The menu of the software contains the following options: characteristic of detector, intensity of the ionising radiation and its dependence on distance and type of absorbing material as well as statistical distribution of ionising radiation [8].

Last year, tribute to the 100th anniversary of Maria Curie-Skłodowska Nobel Prize, we organised the competition for educational projects under the general title *Radioactive World*. The competition was addressed to Polish teachers and their pupils. The Award Committee received 44 projects from upper and lower secondary schools. Knowledge and methodical level of all projects was very high. Most of them engaged not only the science subjects teachers but also specialists of literature, history and art. The committee awarded 15 projects which were the most original and their results were presented to the wide local community by press, radio and TV. The results of the best projects: original lessons plans, posters, WWW pages, computer animations were presented at the conferences and workshops addressed to science teachers and will be published in the methodical resource page of Education of Physics Laboratory.

The use of distance teaching and learning is increasing dramatically in all sections of educations and training all over the world. We would also like to explore its potential for teaching radioactivity issue. For the exemplary lecture we selected the topic "Radioactivity Around Us". First of all we prepared scenario of this lecture and elaborated all necessary educational materials with the use of ICT methods and tools. For presenting the lecture to the science teacher trainers from EU countries we used LearnLinc 6.02 software obtained due to the STEDE (Science Teacher Education Development in Europe) project, within the group 10a, synchronous distance education. By the interaction and discussion with our session participants we got experience sufficient to create the wider database of resources, which we are planning to make for the network of science teachers learning on distance from our University.

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