

## Practice and Assessment for the Young Generation's Understanding of the Radiation

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### 1. Introduction

This study is to develop effective educational contents for the young generation to understand radiation correctly. To achieve it, the first-hand measurements of natural background radiation with the aid of radiation detectors were conducted. Provided are provided radiation detectors, cloud chambers, radiation measuring kit, and various teaching materials. Students participated in the first-hand measurements have been subjected to the relevant Q&A in order to assess the consequent impact on the understanding of radiation before and after the implementation. The representative results are represented and analyzed.

### 2. Methods and Results

The procedures for performing the present study are divided into four, which were the background radiation measurement, training course for school teachers, support of the schools, and assessment.

#### 2.1 Implementation of the first-hand natural background radiation measurement

First of all, the direct measurement was implemented by the experts at schools. It was planned to be implemented at 100 schools totally throughout the country (Table 1).

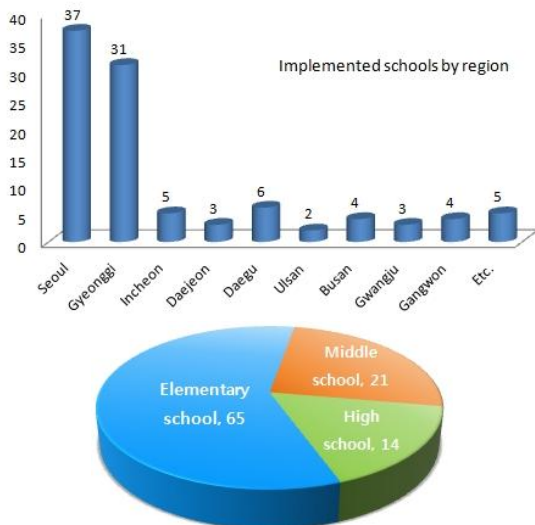


Table 1. The schools planned for the first-hand natural background radiation measurement

The teaching material of the leaflet type with 1 sheet was developed, which included the explanation for the radiation equipments. Also, it covered the guide on the evaluation on the impact of the implementation, collection and analysis of the questionnaire data.

#### 2.2 Implementation of training course for school teachers

As a basic knowledge of radiation is essential for the school teachers, implementation of full-day training courses has originally been planned. However, as there were some difficulties in arranging such a full day courses due mainly to problems in gathering teachers in daytime, a brief 3 hours' courses have been arranged 5 times.

#### 2.3 Support to organize and run Radiation Study Circle (RSC) at schools

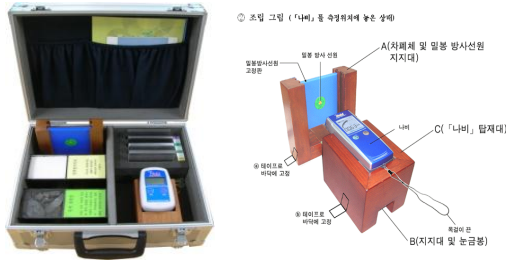
The enrolled RCCs joined were provided to receive the radiation detectors, cloud chambers, radiation measuring kit, and various teaching materials as represented in Fig.1.



(a) Radiation detectors



(b) Cloud chambers and tracks



(c) Radiation measuring kit



(d) Irradiated by Gamma-ray

Fig. 1. The provided equipments and materials for the schools

A training program for the involved teachers was organized once. On the other hands, fifty sets of the hand carry-type natural background radiation detectors were provided for the schools. Overall, 25 RSCs have been supported to be organized and operated. The number of the participated students was 543. Excellent students were selected by a peer review of the reports submitted concerning the RSC activities. The excellent students received an award for their successful activities in the study of radiation. It is believed that the students could deepen their knowledge on radiation by participating in the RSC activities.

#### 2.4 Assessment of the impact consequent on the first-hand natural background radiation measurements

A total of 5,000 students at 100 schools have taken part in the first-hand experience program. The students participated in the first-hand measurements have been subjected to the relevant Q&A in order to assess the consequent impact on the understanding of radiation before and after the implementation. Some of the representative results which were carried out were as follows;

- (a) The average ratio of students who believed 「the radiation level near the NPPs is higher than the other sites far from the NPPs」 was 59 and 44 %, before and after the implementation, respectively.
- (b) The average ratio of participated students who were aware of radiation showed a remarkable increase from 9 to 72 %.
- (c) The average ratios of the participated students who were aware of applications and safe handling of radiation were remarkably increased via participation of the first-hand radiation measurements; that is from 37 to 67 % in the radiation applications and from 56 to 77 % in safe handling of radiation, respectively.
- (d) The ratio of participated students who were in fear of radiation showed a considerable decrease from 59 to 27 %.
- (e) The ratio of participated students who were not in fear of radiation showed a considerable increase from 22 to 65 %.

The obtained results indicated the first-hand measurement of radiation which had been carried out so far was one of the effective means to mitigate the student's over sensitive radiation fear.

### 3. Conclusion

Korea has now twenty one nuclear power plants (NPPs) in operation which generate about forty percent of total electric power of the country. However, it has quite a few difficulties in performing nuclear programs due to the anti-nuclear movement and NIMBY phenomenon prevailed widely over the country. Moreover, the recent Fukushima NPPs' accidents in Japan brought about the vague fear of the radiation. The Education using Radiation detectors will find a wide application for the students of primary, middle, and high schools over the country. Furthermore, experience obtained in the course of the implementation of this project commitment based on a grass-root approach can be extended to apply for people at large. It is believed, and is expected that radiation together with nuclear energy will favorably be understandable by the public.

### REFERENCES

- [1] first-hand personal experience by using radiation measuring equipment, MEST, 2008.
- [2] Promotion of radiation safety culture, MEST, 2010.
- [3] Living with Radiation, the First Hundred Years America, the Powerless Los Alamos Science Blue-bells and Nuclear Energy, web-site copyright 1995~2011 WGBH educational foundation.
- [4] Toda Ichiro, 교육실험노트: "탁상 형 안개상자, Isotope News", 626, 23, Japan Radioisotope Association (2006).
- [5] 에너지.방사선교육을 시행하기 위한 교원세미나, Isotope News, 582, Japan Radioisotope Association (2002).