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SUNRAY PROJECT — A LONG-TERM NATIONWIDE EDUCATIONAL PROCESS

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The Sunray project is a nationwide educational process co-ordinated by the Economic Information Bureau (TaT Group) for ninth graders in Finnish comprehensive schools. The project aims at giving thorough and versatile information on radiation within the framework of various subjects (physics, biology, domestic science, history, European languages, mother tongue, health education etc.).

The Sunray project covers all ninth graders of the existing 600 Finnish comprehensive schools; in all involving some 65 000 pupils. The project, which has been repeated five times, was initiated as part of the European Science and Technology week in 1995. During the first two years it was strongly linked with the science week as natural sciences were seen as a good framework for the chosen perspective. Since 1997, the project has been run as an event in its own right.

The project has applied the method of processing integrated groups of themes, which is an objective of the comprehensive school system and the experimental method of science. As schools make their own decisions about the educational programmes to be adopted every semester, the project has been marketed to schools at the beginning of May. The TaT Group has arranged marketing events in some 10 localities in Finland.

Different theme every year

Each year Sunray has encouraged schools to explore radiation from different perspectives. This idea of changing annual themes is to give teachers new dimensions to the subject and at the same time increase their knowledge about radiation and nuclear power in general. In the first year, the theme of radon was a very useful way to capture the interest of teachers as well as that of the media. Since radon is the largest source of radiation in Finland, the Radiation and Nuclear Safety Authority (STUK) offered schools a radon detection measurement free-of-charge. This was carried out in 200 schools.

In 1996, the theme was light. This common natural phenomenon was studied in great detail. Biological themes comprised e.g. chloroplasts, plant susceptibility to light, and bioluminescence. Printed material was drafted on the chemistry of colour, and experimental proposals made for carrying out lessons in physics and geography.

The third theme involved risks in normal life. Material previously delivered to schools was complemented by additional material related to everyday risks, a risk game and a set of articles. The teacher's risk manual comprises several articles and includes student exercises. The articles examine risks associated with flying, energy generation and the home. An article on safety and electricity was drafted by the Safety Technology Authority (Turvatekniikan keskus). The University of Helsinki provided an item on climate changes. The Federation of Finnish Insurance Companies (Vakuutusyhtiöiden tiedotuskeskus) wrote about risks concerning the young and the airline Finnair about the risks of flying. The material also includes articles on natural radiation in the environment and environmental health.

In addition to natural sciences, the theme of risk was approached from other angles. On a philosophical level, an article entitled **“The one who fears does not play or Is it sensible to take risks?”** was drafted. Perspectives on this theme were provided by Professor Ilkka Niimiluoto in his writing **“The ease of being and the burden of risks”** and academician Pekka Jauho's essay **“Risks and safety in modern society”**.

In 1997, the project produced a game called **The Age of Risk** in which the players evaluated and learned about the share of possible risks one might face. The game includes boards, dice and other material for five groups. It was delivered to 700 comprehensive schools.

In 1998, an information package on radiation produced by the EU Commission was translated into Finnish and distributed to Finnish comprehensive schools. The Radiation and Nuclear Safety Authority (STUK) was responsible for the translation. Altogether, 1000 packages were produced and mailed to the schools which had ordered them. All packages were subscribed for.

Last year, a decision was made to reiterate the basic facts concerning radiation. A brochure **“Radiation is all around”** and overhead slides on this theme were produced. Additional articles about the environmental effects of uranium mines, uranium resources and a description of the uranium cycle from mine to fuel were included.

Videos to Inspire Discussion

It is a challenge to produce a video directed at schools. The video must naturally take into account pupils' points of view. At the same time, however, it must be sufficiently based on facts for the teacher to accept it as valid teaching material. Finnish teachers really pay attention to the teaching material. Entertaining or manipulative material is generally not shown during lessons. So far, three videos have been produced for the project; the first provides information on radiation in nuclear power plants, the second concerns nuclear waste management, and the third deals with climate change.

These videos are loaned to schools free of charge, a service provided by the Economic Information Bureau which is linked to the project. The videos are aimed at inspiring discussion during lessons. All videos have been approved by the teachers. Teacher feedback indicates that this aspect of the project has been a success. According to library data, some 10 000 pupils nationwide have seen the video in class. The videos have also been used to provide information at nuclear power plants.

“Are you glowing?”

Pupils from three schools have assessed the video **“Are you glowing?”**. The pupils were in the age group 14-16 and represented three municipalities from various parts of Finland. An overall impression was sought using grades 4 to 10. The average grade for the video was 7.7. This can be regarded as very good considering the critical attitude of this age group. The video was most liked in northern Finland and less liked in Helsinki. Girls differed from boys such that their assessments from the various schools were equal whereas boys in northern Finland graded the video 1,5 points higher than their counterparts in the south.

The video received positive feedback thanks to the young people who played in it. In addition, the facts were told in an interesting, non-traditional way which was easy to understand and made the children feel relaxed. The video was specifically directed at kids. It was made with humour, and in a fresh, truthful, modern way without forgetting the negative aspects. The fact that nuclear waste will be disposed of in deep bedrock got a positive response.

Negative comments were clearly fewer than positive comments. According to the children, e.g. the music, the indistinct voices of actors, the use of unprofessional actors, artificiality, exaggerated expression, and the lack of female actors negatively affected the grade. Some felt that the nuclear theme was treated superficially, that it was too positive, and that it was underestimating the risks. Doubts were also expressed that the facts were presented from one side only with the objective of showing nuclear energy in a favourable light.

The aim of the video was an approach different from previous nuclear videos produced by TaT. Based on the written responses, this objective succeeded. The following comments from the pupils support this: "It is different from conventional teaching videos", "it is different from the usual video", "a better teaching video than previous ones I have seen" and "fairly good for a teaching video".

"From Bedrock to Bedrock"

"Nuclear waste is a big threat to future generations and therefore the use of nuclear power is not acceptable". This is what many young people in Finland think. Children in comprehensive schools do not have much information on nuclear power or nuclear waste management in their textbooks. However, both matters have been described in some secondary school textbooks. Sunray III had as its main theme "risks". The goal of the new video was such that the child who attends a comprehensive school should formulate an opinion on nuclear waste risks after having seen the video. The Sunray project also sought to market the new video in comprehensive schools.

The video deals with three youths who are making a video about the final disposal of nuclear waste. In this way, facts are introduced in the language and discussions of youth. The main points introduced are:

- nuclear waste is under continuous care and surveillance
- Finland is capable of handling the final disposal of nuclear waste and waste is being handled with care
- a major environmental catastrophe can never arise from nuclear waste

In 1998, "From Bedrock to Bedrock" was awarded second prize in the Finnish Media Message competition in the "Training and motivation programmes" section. The citation stated that the video succeeded in fulfilling a teaching programme on a difficult subject without adopting trickery.

"Change in the Atmosphere"

So far, Finnish school textbooks have provided virtually no information on climate changes. As the positive message of nuclear power is related to changes in the atmosphere and since nuclear power is emission free, a teaching video about the facts associated with climate change was produced as part of the Sunray project. A point of departure for the video was that the matter remains unclear to most teachers as well. A factual and narrative style was adopted. The goal was to show why emission reductions are more difficult for Finland than for other countries as well as to describe what can be done and on what time schedule, taking into account savings, change of fuel types, the increase in renewable fuels and nuclear power.

Matters concerning the increasing greenhouse effect were presented in the video: What effect does climate change have globally and for Finland? What are greenhouse gases and how are they generated? The video assesses international agreements, their goals, time schedules and claims for emission reductions. In addition, the video describes both the current measures and the future potential to reduce emissions in Finland.

Proof of successful and objective presentation in the climate change video was received when the Finnish TV approved the video and played it several times in the School TV.

The Sunray Project as part of the education discussion in Parliament

In 1998, current Minister for the Environment and green party MP Satu Hassi, jointly with a green colleague, introduced the question: "How does the Government handle the objective dissemination of information in schools on politically sensitive issues". The question referred to the Sunray material drafted for the upper level of comprehensive schools. At the same time, five citizens' organisations requested that the Consumer Ombudsman investigate whether the school project of the industry and power companies is legal. They considered the material as one-sided, contrary to ethical teaching norms and demanded that it should be withdrawn.

On behalf of the Government, Minister of Culture Claes Andersson indicated that the Sunray project had no connection whatsoever to the nuclear power campaign. In a written response to parliament, Andersson stated that the best available experts authored the project material and that transparency and objectivity had been adopted in both its preparation and presentation. The minister especially emphasised that the material could be ordered by teachers and that it had not been sent to pupils. The minister's address was prepared by the Ministry of Education.

To guarantee project success, it has been important to co-operate with training professionals from the very beginning. Experts from teacher training institutions and practising teachers have taken part in material preparation. Among them is Maija Ahtee, professor in didactics and a senior lecturer in physics. In her reply she wrote, e.g. "Written submissions concerning the Sunray project show that the professionalism of the teachers who have graduated from institutes of higher learning is not valued". Criticism directed at the Sunray project generates discussion and a positive evaluation by the Ministry of Education encourages furtherance of the project.

Project participants

The Economic Information Bureau of Finland coordinates the project and in 1995-2000 the Radiation and Nuclear Safety Authority (STUK), the Finnish Energy Industries' Federation, the Finnish Electricity Association, Fortum Oyj and Teollisuuden Voima Oy have participated in the project.