1. Problem:

The present survey was conducted to investigate the understanding of radiation phenomena and risk among Norwegians with a reasonable level of general education, but lacking specialisation in physical science.

This principle also holds true in the field of radiation, and a number of publications have dealt with pupils’ and laypeople's conceptions of radiation phenomena. For instance, Lijnse et al. described concepts of radioactivity and radiation held by 15- and 16-year-old pupils in the Netherlands, and Eijkelhof and Millar analysed British newspaper reports of the Chernobyl accident to identify features of the lay understanding of radiation phenomena.

There may be many answers to this question; three of the most evident are the following:

1. The pragmatic reason
2. The democratic reason
3. The educational reason
4. Methods:

The survey was administered in the form of a questionnaire given to 270 students in an elementary physics course at the University of Oslo.

Of the 270 students 191(71%) completed the questionnaire. Of the respondents 53% were women, 45% were men and 2% did not state sex. It cannot be excluded that the 29% who did not respond differed from the respondents in relevant respects.

The questionnaire consisted of 14 questions. Two of these gave background information about gender and background in secondary school, seven measured knowledge and understanding of radioactivity and radiation, and four were designed to give information about radiation fear and attitudes.

To obtain a measure of each respondent’s level of understanding, a point system was developed.

1. Result

A major aim in the survey was to get an overview of the respondents' understanding of some of central concepts concerning radioactivity and radiation phenomena. From the answers to Question 3, it appeared that 89% of the respondents knew of the three radiation types (alpha, beta and gamma), whereas only 34% could correctly state what the radiation consisted of in each case. The definition of one becquerel (Question 5) was known to 25%.

Most apparent in the answers to Question 4, it has previously been observed that laypeople have difficulties distinguishing the concept of radiation from that of radioactive material.

When asked about the concept of the half- life (Question 6), 74% of the respondents gave a definition which might be called correct.

Question7 appeared to be difficult -only 55% attempted an answer. Ten percent of the

respondents answered that the radiation is taken up by the spice, andsome of these

added that the radiation was stored" in the spice, which gave reason to suspect that the

really meant that the radiation made the spice radioactive. Twelve percentsaid explicitly that the radiation made the spice radioactive. This concept is probably aconsequence ofthe lack of differentiation between radiation and radioactive material.

When asked whether they believed that there were radiation sources in their home (Questions 2), 62% answered in the affirmative. Almost 50% of the respondents in a survey of public understanding of science believed that nuclear power stations could cause acid rain.

The respondents had clear perceptions of the kinds of change that ionising radiationcan cause to the human body, and a wide variety of answers was given to the question concerning this (Question 8). The most frequent answer was cancer (mentioned by75%), whereas mutations were mentioned by 49% and genetic damage by 36%.

It appeared that whereas 62%believed that there were sources of radiation in their home (Question 2), only 16% were afraid of being exposed to radiation in their daily life

(Question 1). Significantly women than men were afraid (x^2= 5.37; p = 0.02), whereas

no significant difference was found between the high- and Low-score group in the

proportion of respondents who were afraid of radiation.

When asked whether Sweden should continue is production of nuclear power (Question 9). 38% answered “yes” and 43% “no”, whereas 14% were uncertain and 7% failed to answer A significantly higher proportion of women than men were negative to nuclear power (x^2=17.08; p=0.00004). A small, but significant difference was found between the high score group and the low score group in their attitude to Swedish nuclear power, the high scorers being the more positive (x^2= 4.76; p= 0.03). Half of the protagonists (50%) gave as a reason that the control of plants in Sweden was so good that the risk of accidents was minimal, whereas 26% claimed that nuclear power was an environment friendly alternative. Of the antagonists, 69% gave the risk for accidents as a reason for their standpoint, whereas 21% mentioned problems concerning storage of nuclear wastes.

50% of the Norwegian population regarded nuclear power as “extremely or very dangerous to themselves and their families”.

The respondents were asked whether they personally believed the sub to be a threat to the environment in the northern seas; 57% answered “yes” and 17% “no”, whereas 13% were uncertain and 13% failed to answer. There were significantly more women than men who believed that the Komsomolets was a threat (x^2 = 8.64; p = 0.034), whereas no difference was found between the high- and low-score groups.

Of those who did judge the sub to be a threat, 34% stated that it was a danger to the marine flora and fauna in the area. “Contamination/Irradiation of the environment” was given by 27% as a reason for fearing Komsomolets, whereas 15% thought the radioactivity would contaminate fish and thereby constitute a health hazard to people and 8% said simply that the fish would become radioactive.

1. Discussion:

The lay model of radiation phenomena differs significantly from the expert model.

The investigation revealed an incomplete understanding of some central concepts concerning radiation phenomena. However, knowledge of the biological effects of radiation was reasonably good.