http://dx.doi.org/10.5516/NET.10.2014.033

KOREAN STUDENTS' BEHAVIORAL CHANGE TOWARD NUCLEAR POWER GENERATION THROUGH EDUCATION

EUN OK HAN, JAE ROK KIM*, and YOON SEOK CHOI
Department of Education & Research, Korea Academy of Nuclear Safety, Seoul 135-703, Korea
*Corresponding author. E-mail : jrkim@kans.re.kr

Received March 24, 2014
Accepted for Publication May 13, 2014

As a result of conducting a 45 minute-long seminar on the principles, state of use, advantages, and disadvantages of nuclear power generation for Korean elementary, middle, and high school students, the levels of perception including the necessity ($p<0.017$), safety ($p<0.000$), information acquisition ($p<0.000$), and subjective knowledge ($p<0.000$), objective knowledge ($p<0.000$), attitude ($p<0.000$), and behavior ($p<0.000$) were all significantly higher. This indicates that education can be effective in promoting widespread social acceptance of nuclear power and its continued use. In order to induce behavior change toward positive judgments on nuclear power generation, it is necessary to focus on attitude improvement while providing the information in all areas related to the perception, knowledge, attitude, and behavior. Here, the positive message on the convenience and the safety of nuclear power generation should be highlighted.

KEYWORDS : Nuclear Power, Behavior, Educational Effect, Student, Change

1. INTRODUCTION

The rapid development of scientific technology has brought infinite potential and prosperity to human beings, but at the same time, has caused tremendous new risks which threaten the basis of human life. Due to the development of scientific technology, modern society is facing various socio-scientific issues such as the risk of accidents resulting from nuclear power generation; social problems resulting from energy exhaustion, moral problems regarding biotechnology, refugee problems resulting from climate change, and so on. As a result, science education researchers are highlighting the cultivation of the capability for value-based decision-making and rational coping based on the understanding of scientific technology [1, 2, 3, 4, 5, and 6]. However, students' scientific capability and sensitivity to socio-scientific issues are often lacking [6, 7, 8, 9, and 10]. In particular, risk perception of nuclear power tends to be cognitively anchored in negative images such as the Chernobyl nuclear accident and the Fukushima nuclear disaster, and insufficient responses after the accident. Public risk perception on nuclear power-related technologies or facilities is significantly affected as a result [11, 12]. One of the characteristics is that negative issues such as radioactive pollution of marine products, radioactive concentration in the air, safe food for future generations, as the direct or indirect influences of the Fukushima nuclear disaster, are often reported by media, and it is expected that such incidents will continue[13]. Due to such incidents, negative perceptions of nuclear power have increased [14, 15, 16, 17, 18, 19, and 20]. Thus, Korean people have expressed more concerns about nuclear power safety since the Fukushima nuclear accident in Japan [21, 22]. The public sentiment on new nuclear power plant construction is sharply divided between approval and disapproval [23]. If the Fukushima nuclear disaster in Japan is a sign of risk of nuclear safety, resulting in a philosophical on nuclear power generation safety, it may be inevitable that more fundamental doubts are raised about safety [24], which can cause tremendous social and economic damage. This indicates that education can be effective in promoting widespread social acceptance of nuclear power and its continued use [25]. One study stated the Fukushima nuclear disaster would not have any significant influence on future energy reduction, despite worldwide interest [26]. It argued that because energy is indispensable to humans, nuclear power is an economical and environmentally friendly energy effective for coping with infinite values of climate change, and its use is inevitable.

Nuclear power facilities are based upon their acceptability to local residents and citizens. In Korea, where nuclear power needs to be continuously used for national energy security and economic growth, it is important to enhance the social acceptability of nuclear power [21]. To do so, it is necessary to reassure Korean people and global nuclear power communities regarding safety. However, there is sharp division regarding the perception of nuclear power safety between the expert group of operators and regulators on the one hand, and ordinary citizens, local residents, media, and anti-nuclear groups on the other [27]. There are no absolute answers on socio-scientific issues and such issues are unconstructed problems comprising various alternatives. Thus, the opportunities to understand and listen to various positions should be provided, and value-based decision-making should be encouraged. Through this process, not only scientific and technological understanding and their relationship to society could be cultivated, but also citizens' personal attitudes [9]. Various issues regarding nuclear power, and historically, environmentally, and geologically different factors between countries, should be comprehensively considered [28].

For this study, an experiment was designed to assess behavioral change. This was conducted as part of an educational strategy to enhance public understanding and to foster greater support for nuclear power generation appropriate. In order to provide fundamental evidence for planning an educational intervention strategy, this study analyzed the perception, knowledge, attitude, and behavioral change of elementary, middle, and high school students, who are then expected to have an impact on the education of the general population.

2. METHODOLOGY

In order to rationally change value judgments by providing accurate information on nuclear power generation, behavioral change was analyzed so that the grounds (perception, knowledge, attitude, and behavior) for educational intervention could be derived. As can be seen in [Fig. 1], the research consisted of five steps. The first was research design. In the process of designing the research, the subjects, method, content, and duration of the education, were determined. The Second involved sending official notifications and selecting final subjects, and then conducting a field trip. The third step was a pre-survey and step four involved conducting the lecture. Finally, the post-survey and vote on nuclear power plant construction was completed.

2.1 Subjects and Questionnaire Configuration

The research subjects were elementary, middle, and high school students, who will be the leaders in public sentiment regarding the use of nuclear power generation. A sample of 123 students from three schools in the capital area whose parents gave written informed consent was analyzed. There were 82 male students (66.7%) and 41 female students (33.3%) participating in the research. There were 43 elementary school students (35.0%), 45 middle school students (36.65), and 35 high school students (28.5%).

The questionnaire comprised questions on perception, knowledge, attitudes, and behavior related to nuclear power generation. The video and PowerPoint materials for the education, and ballot papers for the vote were prepared prior to the lecture. For the vote on nuclear power generation, potential construction venues for the hypothetical nuclear power plant were the entire nation and each participant's town. The education method included watching a video (10 minute long) and a lecture (25 minute long), which covered the principles, actual state, and current state of use of nuclear power generation. In order to minimize factual errors, one radiation expert was invited to conduct the education program for each class of subjects. The education was conducted from December 11 to 20, 2013.

As can be seen in [Fig 2], the contents of the survey were knowledge, attitude, and behavior according to the traditional learning model. In line with prior research, perception was analyzed for four factors: necessity, safety (dangerousness), information acquisition (familiarity), and subjective knowledge of nuclear power generation [29]. Each item was rated on a 5-point scale (1 point: strongly disagree–5 points: strongly agree). Objective knowledge was measured by five items regarding the features of nu-

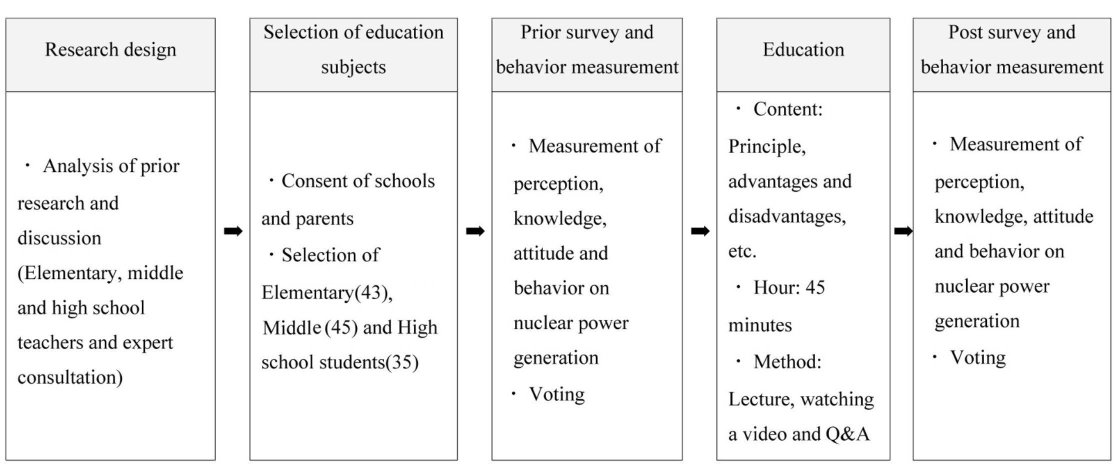

Fig. 1. Research Procedure