

# Standardized System of Nuclear Safety Information for the Promotion of Transparency and Openness

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## 1. Introduction

### 1.1 Research Background

After the Fukushima nuclear power plant accident of Japan, concern towards domestic nuclear reactor safety has continued to increase in Korea, leading to calls for transparency and openness regarding nuclear safety information. There has been an increasing emphasis on the need for increased disclosure of information through the homepage of the Korea Institute of Nuclear Safety (KINS), responsible for nuclear safety regulations, and the Nuclear Safety Information Center (NSIC) to enhance public understanding of nuclear safety. However, due to the dualized structure of the existing KINS and NSIC homepages, improvements in accessibility and convenience are necessary. At the same time, content standardization is required to increase operational efficiency and provide coherent information.

### 1.2 Research Scope and Methodology

In this study, the Delphi method was used to select the major contents to make available on the homepage as well as the main user base definition for the homepage layout development. Also, internal and external expert groups were created to conduct AHP (Analytic Hierarchy Process) analysis and develop the comparative analysis items for the U.S. Nuclear Regulatory Commission(NRC)/KINS/NSIC homepages. Afterwards, problems and points of improvements for the homepage system, design, and profile were derived using heuristic analysis.

## 2. KINS/NRC Homepage Comparative Analysis

### 2.1 Development of Homepage Comparative Analysis Items through AHP Analysis

In order to develop the comparison items for the KINS and NRC homepages, the AHP analysis technique was employed. A survey of 40 experts through interviews and e-mail contacts was conducted for the AHP analysis. Data was collected using a survey questionnaire with randomly arranged pairwise comparison items to develop 8 evaluation items (Identity, Visual, Organization, Readability, Guidance, Trustworthy, Openness, Participation) for heuristic evaluation, and weights were assigned for the evaluation items.

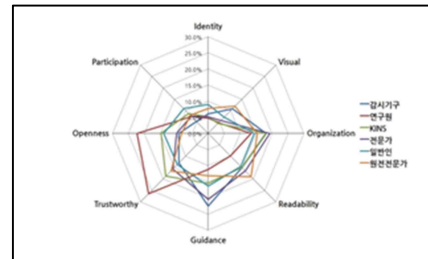


Fig. 1. AHP Analysis Result

### 2.2 KINS/NRC Homepage Heuristic Analysis through an Expert Group

Based on the evaluation items through the AHP analysis, heuristic analysis was conducted with 5 external experts (Nuclear Engineering, UX, UI) to perform comparative analysis of the KINS and NRC websites. Heuristic analysis involved analyzing the websites for each evaluation item, calculating the overall and average evaluation scores for each item, and comparative analysis of the KINS/NRC homepages.

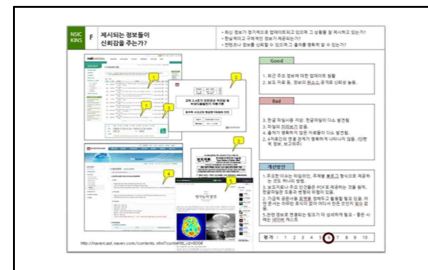


Fig. 2. Heuristic Analysis Contents

Applying weights to the difference (delta value) in the KINS/NRC evaluation score average for each expert, it was found that the difference was greatest for the Guidance, Organization, and Trustworthy items out of the 8 items, indicating that adjustment of the priority improvement items for each item is necessary.

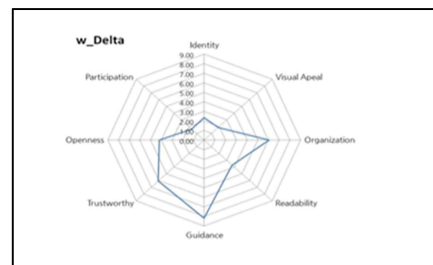


Fig. 3. Heuristic Analysis Result

### 3. Setting a Clear Purpose and Core Values for the KINS Homepage

#### 3.1 Delphi Method as a Decision Making Method

Setting a clear purpose and core values in the operation of the homepage should be prioritized for the improvement of the KINS/NSIC homepages. Accordingly, the Delphi method was used to reflect the intention of the users. The Delphi method is a qualitative method that predicts the future by advancing through iterative collection and exchange of various experts. The method is a set of procedures that combines and organizes expert opinions regarding the issue for prediction. It resolves problems through the structuralization of communication comprising of repetitive feedback in the form of expert opinion establishment, arbitration, and negotiation.

In this study, the Delphi method is utilized because user profile identification necessary for analysis of the user experience in the existing website is difficult, and the role and nature of the website vary according to the persons concerned. The Nuclear Safety Information Center (<http://nsic.kins.re.kr>) used as the case in this study deals with information of high sensitivity and the approach standpoint and content demanded differ significantly according to the persons concerned. Therefore, the survey was mainly used since face-to-face discussions between the persons concerned may lead to difficulty in mediating differences in opinion.

#### 3.2 Delphi Survey for Homepage Layout Development

Delphi analysis was conducted using a survey questionnaire over 3 iterations by 17 experts of related professions. Survey responses were collected through e-mail and the survey items were regarding the main user definition and weight distribution for each user base for the website, direction of the website content organization, and the role and nature of the website. The survey was conducted over 3 iterations.

#### 3-3. Delphi Survey Results

##### A. Main User Base

There were a lot of responses claiming that the main user base of the website should be set to “nuclear power plant area residents and local government” and “civic organizations and monitoring bodies.” Although public institution websites have to reveal all information to general citizens by principle, it is considered necessary to set the main user base to a specific user base of high relevance due to the nature of the provided information.

##### B. Major Contents Accessed

The major contents accessed by users of the website were “accident and problem information,” “real time nuclear safety information,” “major issues,”

and “real time radiation safety information.” This implies that users access the website for information specific to KINS rather than generic information.

#### C. Special Features Aiding Information Searching

The special features “special menu,” “search function,” “related links within the body,” and “customized service for user groups” were found to be important in aiding information searching. The “special menu” refers to the specially organized menu regarding current major issues in the spotlight socially. One example of a major issue is last year’s Fukushima nuclear disaster. For such an issue, users want a one-stop comprehensive search method for related information. On the other hand, “personalized service,” which is considered important in portal or shopping mall websites, is evaluated with relatively low importance. Taking into consideration the nature of the website, it can be interpreted that more weight is placed on the public purpose of information openness than personalization.

## 4. Conclusions

The implications arising from the Delphi analysis results were applied to the homepage layout.



Fig. 4. Delphi analysis results were applied to the homepage layout.

In the nuclear safety information standardized system construction process, the comparative analysis conducted using the AHP and heuristic analyses of the NRC homepage resulted in deriving improvements for the Guidance, Organization, and Trustworthy items of the KINS/NSIC homepage. Furthermore, through the Delphi analysis, a clear purpose and core values were set for the KINS website, and the needs of the main user base were identified. By developing the homepage layout, user interest and utility were raised to improve the organization method and layout. Through this study, KINS was able to construct a nuclear safety information standardized system and increase transparency and openness by providing feature enhancements in information provision as well as user accessibility and convenience.