

# How Experts Estimate the Public's Perceptions of Nuclear Power: Implications for Effective Nuclear Communication Program

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## 1. Introduction

The use of nuclear energy has been one of the controversial topics for heated public debates, frequently covered by the media in Korea. While a series of studies have examined public perceptions regarding the acceptance of nuclear power, research on experts' views on public's perceptions has been limited. Considering the potential role of experts in nuclear communication, this study investigates how the experts working in nuclear-related organizations perceive the issue of public acceptance of nuclear power in Korea. Specifically, based on Co-orientation Model (McLeod & Chaffee, 1973), this study compared the experts' own views and the public's views that the experts estimate. Additionally, the experts' concerns over the public acceptance issue and roles in nuclear communications were also examined and discussed.

## 2. Methods and Results

### 1. Co-orientation Model

According to Co-orientation Model (McLeod & Chaffee, 1973)[1], individuals act toward one another based on their perceptions of the other's views regarding a certain issue.

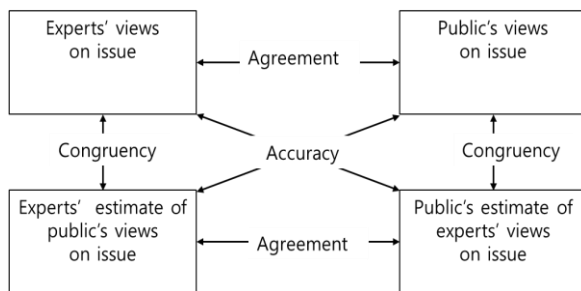


Figure 1. Co-orientation Model

As shown at Figure1, *Agreement* refers to the actual discrepancy between experts and public in their views on nuclear energy issue. *Congruency* refers to each party's perceptions of agreement with the other party. *Accuracy* measures the extent to which each party's estimate coincides with the other's actual views.

This study examined the level of Agreement, Congruency, and Accuracy in experts' perceptions of public's views on nuclear energy issue.

Three hundreds and two experts working in nuclear-related organizations participated in our survey, and a

total of 300 responses were analyzed in this study. In order to measure public views, a professional research company sent a link to a questionnaire to 1,000 Seoul citizens, and a total of 448 respondents completed the survey. To analyze the data from two groups, a series of t-tests using SPSS22 program were conducted. See Table 1 for the results of analyses.

	Experts' view <sup>a</sup>	Experts' perceptions of public's view <sup>a</sup>	Public's view <sup>a</sup>	t-values <sup>a</sup>		
				Agreement <sup>a</sup>	Perceived agreement <sup>a</sup>	Accuracy <sup>a</sup>
Trust in NP technologies <sup>a</sup>	3.92 <sup>a</sup>	2.69 <sup>a</sup>	2.72 <sup>a</sup>	18.31*** <sup>a</sup>	22.52*** <sup>a</sup>	.38 <sup>a</sup>
Trust in NP experts <sup>a</sup>	3.94 <sup>a</sup>	2.80 <sup>a</sup>	2.99 <sup>a</sup>	18.33*** <sup>a</sup>	20.14*** <sup>a</sup>	2.74** <sup>a</sup>
Trust in NP operator (KHNP) <sup>a</sup>	3.74 <sup>a</sup>	2.54 <sup>a</sup>	2.54 <sup>a</sup>	14.29*** <sup>a</sup>	19.62*** <sup>a</sup>	.155 <sup>a</sup>
Trust in NP-related gov. orgs <sup>a</sup>	3.59 <sup>a</sup>	2.54 <sup>a</sup>	2.09 <sup>a</sup>	16.54*** <sup>a</sup>	19.90*** <sup>a</sup>	6.34*** <sup>a</sup>
Trust in info from NP orgs <sup>a</sup>	3.74 <sup>a</sup>	2.71 <sup>a</sup>	2.42 <sup>a</sup>	18.62*** <sup>a</sup>	18.03*** <sup>a</sup>	4.14*** <sup>a</sup>
Trust in info from media <sup>a</sup>	2.87 <sup>a</sup>	3.19 <sup>a</sup>	2.47 <sup>a</sup>	6.08*** <sup>a</sup>	5.04*** <sup>a</sup>	10.47*** <sup>a</sup>
Trust in info from SNS <sup>a</sup>	2.42 <sup>a</sup>	3.12 <sup>a</sup>	2.39 <sup>a</sup>	.439 <sup>a</sup>	9.43*** <sup>a</sup>	10.69*** <sup>a</sup>
Knowledge in NP application <sup>a</sup>	2.12 <sup>a</sup>	3.51 <sup>a</sup>	3.84 <sup>a</sup>	18.31*** <sup>a</sup>	31.72*** <sup>a</sup>	10.28*** <sup>a</sup>
NP risk perception <sup>a</sup>	7.82 <sup>a</sup>	3.35 <sup>a</sup>	4.89 <sup>a</sup>	26.65*** <sup>a</sup>	26.751*** <sup>a</sup>	2.70** <sup>a</sup>

Table1. t-tests for Agreement, Congruency, and Accuracy

First, as for *Agreement*, there were significant differences between experts' and publics' views on NP issues: (1) the level of trust in NP technologies, NP experts, NPP operator, and NP-related governmental organizations, (2) the level of trust in NP information from NP organizations and the media, (3) the level of knowledge perceptions in NP applications, and (4) NP risk perceptions. That is, the experts tend to have higher level of trust, knowledge perceptions, and less risk perceptions as compared to publics. There was no significant difference between experts' and public's level of trust in NP information from SNS.

Next, *Congruency* refers to the difference between experts' view and experts' perceptions of public's view (i.e., experts' perceptions of agreement). The results show that experts tend to assume that there would be the gaps in their views and public's views on all the items, including the level of trust in NP information from SNS. The experts estimated that publics would trust the information from SNS ( $M = 3.35$ ) more than the experts would ( $M = 2.42$ ).

Finally, *Accuracy* refers to how accurately experts estimate public's views on NP issues. It was found that there were significant differences between the experts'

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estimates of public's views and the public's actual views. That is, the public tend to trust NP experts greater than experts estimated, while trusting governmental organizations (e.g., regulating bodies) less than experts estimated. Also, the public tend to trust NP information from *all* sources (e.g., NP organizations, the media, and SNS) less than experts estimated. As for perceived knowledge in NP applications, public tend to perceive they have higher level of knowledge in NP than experts estimated. Finally, the public tend to have a greater level of risk perceptions regarding NP, as experts estimated.

## 2. Experts' views on public acceptance of NP

In order to examine the experts' views on public acceptance of NP issue, five variables were measured using a series of statements on Likert scales ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*): Understanding of PA issue ("I have a good understanding of PA issue") ( $M = 3.52, SD = .90$ ); Concerns for PA issue ("I have concerns over PA issue") ( $M = 3.55, SD = .99$ ); NP advocating ("I often explain NP issues to family and friends") ( $M = 3.53, SD = .98$ ); NP advocating intent ("I have an intention to explain NP issues to family and friends") ( $M = 3.95, SD = .81$ ); PA education need for experts ("Experts in NP-related organizations need education regarding PA issue") ( $M = 4.18, SD = .83$ ).

Then, a series of ANOVA tests using SPSS22 program were performed to investigate if there are differences in experts' views due to their working areas.

### a. Understanding of PA issue

There was a significant difference among experts from different areas.  $F(1, 290) = 3.66, p = .003, partial Eta squared = .06$ . Specifically, those working in NPP operating company tend to perceive they have a good understanding of PA issue ( $M = 3.77$ ), as compared to those in NP-related governmental organizations ( $M = 3.30$ ).  $p < .01$ .

### b. Concerns for PA issue

There was a significant difference among experts from different areas.  $F(1, 290) = 16.18, p < .001, partial Eta squared = .22$ . That is, experts working in the operating company ( $M = 4.03$ ) and R&D institutes ( $M = 3.87$ ) tend to have greater concerns over PA issue, as compared to those in governmental organizations ( $M = 3.27$ ) and engineering companies ( $M = 3.24$ ) all at  $p < .05$  level.

### c. NP advocating

There was a significant difference among experts from different areas.  $F(1, 290) = 5.52, p < .001, partial Eta squared = .09$ . Specifically, those working in NPP operating company tend to frequently explain NP issues

to their family and friends ( $M = 3.90$ ), as compared to those in NP-related governmental organizations ( $M = 3.26$ ).  $p < .001$ .

### d. NP advocating intention

There was a significant difference among experts from different areas.  $F(1, 290) = 4.82, p < .001, partial Eta squared = .08$ . Experts working in NP-related governmental organizations tend to have the least intention to explain NP issues to others, as compared to those in the operating company ( $p < .01$ ) and other areas.

### e. PA education need for experts

There was no difference in this item among experts from different areas.  $p > .05$ . That is, the experts from all areas tend to think that experts in nuclear-related organizations need education regarding PA issue.

## 3. Conclusions

This study empirically demonstrated the gaps between experts' and public's views on NP issues. That is, the experts tend to have higher level of trust in NP-related organizations and information, NP knowledge perceptions, and less risk perceptions as compared to publics. The experts also perceived such discrepancies between publics and themselves. However, the experts' estimates of public's views were not all accurate. There were also gaps between experts' estimate of public's views and public's actual views.

That is, the public tend to trust NP experts greater than the experts estimate, while less trusting governmental organizations than the experts estimate. Also, the experts estimated that public would trust the information from the media and SNS more than NP organizations, but the public actually trust the information from all sources *less* than the experts estimated. Finally, publics had the greater NP knowledge perceptions and risk perceptions than the experts estimated.

The findings of this study suggest that NP organizations and the experts may need to develop nuclear communication program by correctly understanding the public's views on NP issues. As Chaffee and McLeod (1970) noted, "*perfect communication... should always improve accuracy... to the point where each person knows precisely what the other is thinking*"(p.9). Effective two-way communication would then lead to the higher level of accuracy, congruency, and ultimately the agreement between NP experts' and publics' views.

## REFERENCE

- [1] McLeod, J. & Chaffee, S. (1973). Interpersonal approaches to communication research, *American Behavioral Scientist*, 16, 469-499.