

Public Service Posters for the Societal and Ethical Issues (SEI) of Nanotechnology

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Abstract:

Due to nanotechnology's current and potential impact on society, the National Nanotechnology Infrastructure Network (NNIN) recognizes the importance of promoting consideration and awareness of the societal and ethical implications of nanotechnology among its facilities' users. The goal of this project was to develop a series of posters encouraging NNIN laboratory users to consider societal and ethical issues (SEI) in their research, especially with regard to maximizing the benefits and reducing the potential societal risks of their work. Five thematically-integrated posters were finalized and placed in the fourteen NNIN sites across the country.

Introduction:

To effectively stimulate SEI consideration, poster messages were created employing the motives of nanotechnology researchers to conduct research, since there is evidence that such underlying motives influence individual attitudes and behaviors. A series of focus groups were conducted, with Cornell NanoScale Facility (CNF) users, to gain insight into these underlying motivations and to receive feedback throughout the development of the campaign posters.

Methods:

Focus groups were conducted using CNF users as participants. Users were asked to volunteer 30 minutes or more, during a 2.5 period of time, in order to provide feedback on various aspects of the project. Discussion participants were provided lunch, and could arrive or leave at any time during the time period. These focus groups allowed us to develop posters that were closely aligned with the interests of the intended audience.

Three different focus groups were used to:

- a) Identify the motivations of nanotechnology researchers to conduct research.
- b) Test and discuss possible poster messages developed from previous focus group feedback.
- c) Test, discuss, and refine initial mock-ups of posters developed from revised messages based on CNF user feedback.

Results:

Several key motivating factors were identified in Focus Group 1; the opportunity to work in an emerging field, the belief that field is growing, opportunities for career advancement, opportunities to work with diverse fields, enjoyment of the challenges encountered in one's work, and a desire to

increase one's personal expertise in nanotechnology. Some participants also identified the desire to facilitate discoveries and applications that would be beneficial to humanity as a motivating factor. Focus Group 1 also provided insight into the obstacles we faced. The posters needed to overcome low self-efficacy beliefs among CNF users with regard to the degree of control they could have over the application of their research or their ability to reduce societal risks. Another obstacle was participants' belief that risk management and risk prevention is the responsibility of non-scientists, and therefore not something scientists should think about. Furthermore, considering the potential risks of one's work was sometimes felt to be uncomfortable, threatening, or disruptive to research and personal goals. Lastly, the potential risks in nanotechnology are often uncertain or unknown, making them difficult to address.

Using these findings, fifteen messages were developed and evaluated in Focus Group 2. Any messages perceived to be from a non-scientist or "outsider" source were rejected by users. Such "outsider" messages were usually perceived to be alarmist or create unrealistic expectations for researchers. Messages that were well-received tended to emphasize giving equal consideration to both the benefits and potential risks of research. Including some degree of inspiration was also effective, as seen in messages incorporating personal and professional goals with pro-social goals associated with the desired societal impact of one's research.

Six messages were selected and revised to use for posters. With the help of a graphic designer, mock-ups of posters were developed around each message. A slogan intended to serve as a tagline for the campaign was also incorporated into all the posters. Three different slogans were tested.

In Focus Group 3, participants provided feedback on the posters and ranked the slogans in order best to worst.

Users liked posters using natural imagery, and considered it a welcome addition to the relatively stark environment of the clean room. Images that inspired an immediate and meaningful connection to the message were most effective. Posters conveying a mutually beneficial relationship between nanotechnology research and SEI consideration were well received, highlighting the importance of avoiding any images that would make the posters seem alarmist or ominous.

Five of the posters were selected for revision and finalization.

Conclusions:

CNF user reactions during focus groups can serve as a predictor of the poster campaign's success. During focus groups, messages and posters sparked in depth discussions about the societal impact and the ethical responsibilities of researchers.

Some participants reported that they thought more about the societal and ethical implications of their research after attending even one focus group. This suggests that posters will be effective in stimulating some degree of SEI consideration among researchers. It also suggests that users are often ready to think critically about these issues and questions, but prompting is necessary.

Future Directions:

Once the five posters were finalized, they were distributed to the fourteen NNIN sites. In addition, full posters or elements of the posters may be incorporated into the NNIN's website.

A method of evaluating the effect of the posters has yet to be determined, but this would provide a valuable insight into the effectiveness of the posters.

The five posters are shown below and on the next pages.

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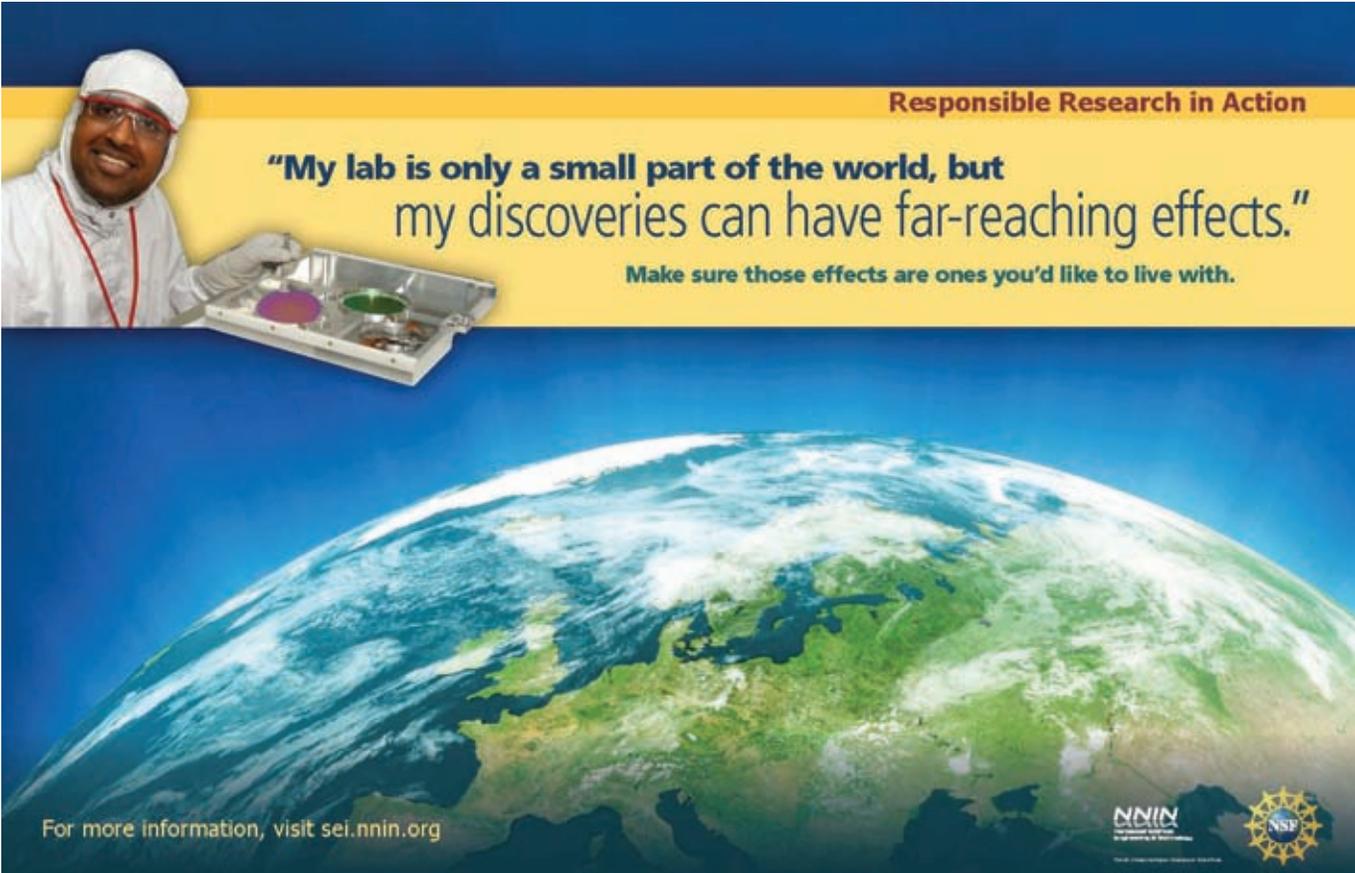

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