TEACHING & LEARNING

Conversations about Technology and Society: Techniques and Strategies to Encourage Civic Engagement in Museums

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Abstract

Museums are changing the way they connect with their communities by positioning themselves as venues for civic engagement and multidirectional dialogue. Through an effort known as Nano and Society, hundreds of museums and universities have collaborated to encourage conversations among community members, educators, scientists, and others about nanotechnologies. Nano and Society conversations focus on public audiences' experiences and values, validating their opinions and identifying a role for them in making decisions about emerging technologies. This article describes how the content and design of Nano and Society conversations support participant learning, shares facilitation techniques that educators and scientists can use to implement the conversations in informal learning settings, and summarizes the professional and public impacts of the project.

Introduction

The National Informal STEM Education Network (NISE Net) is a community of informal educators and scientists dedicated to supporting learning about science, technology, engineering, and math (STEM) across the United States. Network partners include over 600 museums, universities, and other organizations that work together to develop, implement, and study methods for

engaging public audiences in learning about current STEM research and its social dimensions (Ostman 2017).

The Network has experimented with a variety of educational products to engage public audiences in learning about the societal and ethical implications of current STEM research. These include interactive exhibits (Ostman 2015) and hands-on activities that invite exploration and discovery (Ostman 2016a, 2016b); forums that encourage dialogue among experts and citizens (Herring 2010; Lowenthal 2016); museum theatre programs that use theatrical techniques to create and cultivate emotional connections (Long and Ostman 2012); and games to foster play and social interaction (Porcello et al. 2017). Of these approaches to the social dimensions of STEM, to date the most widely adopted products and practices were developed as part of a project known as Nano and Society.

The project included a year of planning and development in 2011–2012 and was launched in 2012–2013 with a series of workshops that involved more than 50 museums and universities across the United States. The project team created a set of key concepts for conversations about nanotechnologies, a variety of conversational activities, and a suite of training materials. In 2013–2016, Nano and Society concepts, strategies, and resources were also incorporated into hands-on activity kits and exhibits that were distributed to hundreds more Network partners.

Early in the project, the team talked to professionals at Network partner organizations, including museums and universities, to learn more about the barriers to and opportunities for incorporating public learning experiences focusing on the societal and ethical implications of nanotechnologies. These discussions indicated what was needed in order for this content to be widely integrated into partners' programming. First, Nano and Society themes had to be offered through common engagement formats that partner organizations were already using, such as hands-on activities, rather than new formats that were resource-intensive to learn and implement. Second, partners felt that an open-ended, conversational approach focusing on the public's own ideas and values was more appropriate for their public audiences than a comprehensive discussion of costs, risks, and benefits of complex new technologies. And third, Network partners needed professional development in order to gain the necessary skills and confidence to implement this new approach.

The Nano and Society project team included members from Arizona State University, the Museum of Life and Science, the Museum of Science and Industry, the Oregon Museum of Science and Industry, the Science Museum of Minnesota, and the Sciencenter in Ithaca, New York. The work was supported by the NISE Network (in its original identity as the Nanoscale Informal Science Education Network) and the Center for Nanotechnology in Society at Arizona State University (CNS-ASU), each funded by the National Science Foundation for more than 11 years.

The resulting Nano and Society activities engage museum staff, scientists, and visitors in meaningful conversations about the relevance of emerging technologies to our lives. The conversations are designed to focus on participants' own experiences and values related to technologies, to validate their opinions and identify a role for them in making decisions about emerging technologies, and to support learning as a social process. They are skillfully facilitated by educators or scientists to help participants apply their ideas to decisions about future nanotechnologies that we face as a society. This article describes how the content and design of Nano and Society conversations support participant learning, shares techniques that educators and scientists can use to implement the conversations in informal settings such as museums, and summarizes the professional and public impacts of the project.

Multidirectional Dialogue

Museums and their community partners represent an ideal location for people to explore perspectives on emerging technologies. Museums serve broad and sizeable audiences across the United States and are perceived as trusted venues for learning and socializing (AAM 2015). Although museums are increasingly interested in serving as community forums and promoting civic engagement, as a whole the field is not yet well equipped to do so in a way that is universally welcoming. In response, the Nano and Society project focused on increasing the capacity of museums across the country to engage their audiences in meaningful conversations about nanotechnologies.

The project is part of a growing movement for museums to provide a space for thoughtful reflection

and civil conversation among multiple and diverse public audiences. Leaders, researchers, and practitioners across the field are calling for museums to serve as essential community resources and provide authentic, participatory learning experiences that address relevant and timely issues (Davis et al. 2003; Kadlec 2013; McCallie et al. 2009; Simon 2010). Professional organizations and funders emphasize the convening power of STEM-rich museums and their potential to promote civic engagement related to science-in-society (e.g. AAAS 2017; ASTC 2017; Ecsite 2017; IMLS 2017; NSF 2017; Science Center World Summit 2014).

One aspect of this movement has been the development of programs that address issues that their communities care about, introduce current scientific research, bring together scientists and community members, and provide multidirectional dialogue and engagement among participants. Museums of all types are increasingly experimenting with dialogue-based programming and exhibitions, particularly for addressing complex, contested, or sensitive topics (Bell 2013; Davies et al. 2009; Kollmann 2011; Kollmann et al. 2012; Kollmann et al., 2013; Lehr et al. 2007; McCallie et al. 2007; Ostman et al. 2013; Reich et al. 2007).

The Public Conversations Project defines dialogue as "any conversation in which participants search for understanding rather than for agreements or solutions," and which is clearly distinct from "polarized debate" (Herzig and Chasin 2011, 3). The National Coalition for Dialogue & Deliberation characterizes dialogue as a process that "increases understanding, builds trust, and enables people to be open to listening to perspectives that are very different from their own" (NCDD 2014, 1). Dialogue allows people to share their values, perspectives, and experiences about difficult issues and to hear from others. It helps dispel stereotypes, build trust, and open people's minds to ideas that are different from their own. Dialogue can, and often does, lead to both personal and collaborative action, but that action is not an essential outcome of dialogue (Bell 2013; Davies et al. 2009).

As a public engagement process, dialogue has several general characteristics. It involves utilizing facilitators and ground rules to create a safe atmosphere for honest, productive discussion; framing the issue, questions, and discussion material in a balanced and accurate manner;

FIGURE 1. Museum visitors use an exhibit challenging them to build a future that includes new nanotechnologies. *Photo by Emily Maletz, courtesy of the NISE Network.*

talking face-to-face; considering all sides of an issue; and establishing a foundation for continued reflection and possibly for future decisions or actions (NCDD 2014, 1). Within this general definition, the Nano and Society team focused on creating opportunities for dialogue that could be integrated seamlessly into a regular museum visit, were appropriate for general public audiences, and could be facilitated by any staff member or volunteer.

Nanotechnology and Society Content

Nanoscale science and engineering is a relatively new, interdisciplinary field of research that studies and manipulates matter at the level of atoms and molecules, enabling innovations in materials and devices. Some new nanomaterials and technologies allow improvements to existing products, such as computer chips, sunblock, and stain-resistant fabrics, while others could be transformative, such as elevators to space, invisibility cloaks, and cures for cancer. Because nanotechnologies are still developing, as a society we can influence what they are and how they are used. While the capability to create and use new technologies is based on advances in science and engineering, our individual and collective decisions about which technologies to develop and use are societal issues, with cultural, ethical, environmental, political, and economic dimensions. In order to participate fully in decisions about emerging technologies, Americans need both

scientific and citizenship literacy skills (Partnership for 21st Century Skills 2015).

Nano and Society conversations offer participants an opportunity to understand the relationship between technologies and society, consider how emerging technologies will influence our lives, and learn how we can shape the development of new technologies. In other words, these conversations explore our values as individuals and consider the kind of future we want to build. Three "big ideas" provide a conceptual framework for the conversations: (1) Values shape how technologies are developed and adopted; (2) Technologies affect social relationships; and (3) Technologies work because they are part of larger systems (Wetmore et al. 2013).

Nano and Society conversations explore the many dimensions of the relationship between technology and society. They acknowledge that we will always have imperfect information about risks, benefits, and consequences, but emphasize that as individuals and as a society we still must make decisions about what science we will pursue and what technologies we will use. The goal of the conversation is not to solve complex issues on the spot, but rather to give public audiences the opportunity to develop knowledge, skills, and attitudes that are essential to engage deeply with current science and to participate as citizens. This shift to a science-in-society framework gives every visitor a role in the conversation, since the discussion is not about the technical aspects of scientific advances, but rather about the possibilities science and technology raise for our future, and what we want that future to be as individuals and communities.

Design Strategies

Nano and Society conversation are designed to have a flexible format, to include interactive elements, and to focus on accessible key concepts. They are relatively brief experiences that can be offered on the museum floor or incorporated into longer programs. They usually include a hands-on activity, demonstration, game, or other interactive element as a conversation-starter. Educators, scientists, and public audiences with a wide range of background knowledge and experience can participate in them equally, because they focus on the aspects of technologies that everyone has experience with: their own values, possible impacts on their social relationships, and

FIGURE 2. Educators and scientists learn a game where participants prioritize the development of new nanotechnologies. *Photo by Emily Maletz, courtesy of the NISE Network.*

the ways technologies interact as parts of systems in their lives. These design strategies allow the conversations to be used in a variety of ways in informal settings, with diverse participants.

The Nano and Society team uses a "cupcake" analogy to explain how these conversations are different from other kinds of informal learning experiences that focus on technologies. In a typical demonstration about a new technology, a museum educator might focus on the technology, talking about why it is amazing, who invented it, and how it is made. Finally, the educator might conclude by describing the impact that the technology could have on society and ask if there are any questions. In this approach, the societal and ethical implications of the technology are added on at the very end of the experience, like the sprinkles on top of a cupcake. In a Nano and Society conversation, the social dimensions of the technology are baked into the experience, not sprinkled on top. Both society and technology are integral and are considered together throughout the conversation.

For example, in a game called "Exploring Nano & Society—You Decide," participants are given a set of cards that present a variety of new and emerging nanotechnologies, such as gold nanoshells for treating cancer and miniature military drones. The cards include the kinds of basic information described above, but the interaction does not focus on the technical aspects of the technologies. Rather, the participant group is asked to browse the

new technologies and decide which ones they think are most important for society and should be prioritized for development. Usually, participants quickly realize that there are many different factors that determine which technologies are most "important," and they discover that there are different opinions within their group. Often, participants are concerned that there may be downsides or unintended consequences to these technologies that we cannot predict. They may decide that the potential benefits of some technologies seem worth the potential costs and risks, while others do not. They may even go so far as to "ban" one or more of the options as too risky. Other technologies may be declared cool by some but frivolous by others, with negligible benefits. When the group settles on a scheme (or schemes), the facilitator introduces a character card. These cards present different people from around the world, such as a mother in Mozambique or an Iraqi soldier, and suggests some of the things those characters value and are concerned about. The group is asked to reprioritize the technologies based on the perspective of the character on the card. This resorting activity helps the group to see that technologies benefit individuals and countries in different ways and to different degrees, and that different people and countries may be interested in developing and using different kinds of technologies.

The design of the You Decide activity is simple, but it promotes rich conversations. Often, participants raise most of the key learning concepts amongst themselves, with just a bit of guidance from the facilitator. The facilitator joins in at key moments: explaining the game play, helping the group clarify their thoughts about a particular technology, judiciously choosing a character card that offers a different perspective, and helping the group draw some general conclusions from the game. Throughout, the conversation focuses equally on technologies and society, rather than primarily on the technologies themselves. That is, the social dimensions of technologies are baked into the conversation, not sprinkled on top.

Facilitation Techniques

In Nano and Society conversations, the typical roles of the educator or scientist and the participant shift. The educator or scientist takes on the role of facilitator rather than expert, asking questions, offering ideas or information to consider, and providing new perspectives. Meanwhile, participants take on some authority by contributing their values and experiences related to technologies. The facilitator guides the conversation by helping participants reflect on and form their own ideas and opinions and by introducing new perspectives and issues (Ostman et al. 2013; Wetmore et al. 2013).

Network educators have identified several techniques that help them facilitate interesting and meaningful conversations. The facilitator first invites participants to try the activity, demo, or game. "This introductory experience establishes rapport, provides some basic familiarity with nanotechnology, and introduces a topic for conversation. Then, the facilitator initiates a conversation by asking questions or making observations about what participants say and do. This validates participants' perspectives and establishes a two-way interaction focused on developing ideas, rather than a one-way presentation of information. Then, the facilitator draws out participants' experiences and values related to technologies. The facilitator might reflect participants' ideas, ask open-ended questions, make connections to things participants are familiar with from from everyday life, or offer additional information for consideration. The facilitator gently guides the conversation, following participants' interests and ideas. While the facilitator always has the key concepts in mind, and often has a repertoire of talking points and connections related to a given activity, the conversation never follows a set script. The facilitator also makes sure to involve everyone in the group. Finally, the facilitator

FIGURE 3. Museum visitors experiment with refraction and talk about what would happen if invisibility cloaks existed. *Photo by Emily Maletz, courtesy of the NISE Network.*

follows participants' cues, recognizing when the group is ready to move on and wrapping up graciously (Ostman et al. 2013).

For example, in the "Exploring Nano & Society—Invisibility" activity, the facilitator starts with a classic science demonstration about the refraction of light in order to spark participants' curiosity. The facilitator explains that researchers are experimenting with ways of bending light to cloak objects, making them invisible to the human eye or to surveillance devices. So far, they have only succeeded at the nanoscale, but full-size invisibility cloaks could be coming soon. The facilitator then initiates a conversation about what participants would do if they had an invisibility cloak. A child might suggest mischievous activities, such as staying up past her bedtime or spying on her brother. The educator might ask the child how she would feel if someone spied on her using an invisibility cloak, leading to a discussion about privacy rights. A parent might ask what would happen if criminals had invisibility cloaks, turning the conversation to government regulation of technologies. Another child might suggest we need additional technologies—such as a cloak-detector—to deal with the problems this new invisibility technology introduces. The facilitator might point out that many of these issues have come up with previous technologies, and the group might think about how we can learn from some of these previous experiences.

Whichever way the conversation goes, the facilitator can draw out one or more of the Nano and Society key concepts. As they think and talk about the invisibility cloak, participants come to understand some of the ways in which they make and contribute to decisions about technologies. They recognize how this new technology would affect the way they interact with other people. And they articulate kind of future they want to live in and the ways they think emerging technologies may help build or block that future.

In a successfully facilitated conversation, participants enjoy their experience, develop an understanding of one or more of the key concepts of technology and society, connect these concepts to their own lives, and recognize their role as a decision-maker with regard to technologies (Wetmore et al. 2013). All parties in a conversation—educators, scientists, and public participants—explore

FIGURE 4. An educator and museum visitors imagine what our world would be like if it were possible to take an elevator to space. *Photo by Gary Hodges, courtesy of the NISE Network.*

concepts and practice ways of learning, talking about, and thinking about technologies that they can continue to apply in other aspects of their work and lives.

Another activity, "Exploring Nano & Society—Space Elevator," asks participants to imagine what would happen if new nanomaterials made it possible for us to build elevators into space and invites them to sketch or talk about their ideas. Among intergenerational groups, children often feel confident drawing, while the facilitator and adults in the group discuss and ask questions. For example, at a community science night, one young girl meticulously drew a picture of a future space elevator, detailing how it would be powered, who could ride it, the route it would take through the solar system, training requirements for elevator staff, and the food they would serve on board. An adult then asked a simple but powerful question: "What's up there when you arrive?" This led to a imaginative discussion about what kind of infrastructure we would build if we were colonizing space. As the girl started to draw houses, family members wondered, "Would our houses look like houses on Earth or would they have to be different for us to survive in space? Do we need mailboxes in space? Can we get mail? How do we communicate with people on Earth?" The act of drawing in concrete details inspired the group to consider a whole variety of interrelated systems and social structures we have on Earth and make decisions about whether or not

they might need or want to recreate them if they were starting fresh somewhere else.

Ideally, these conversations empower participants (educators, scientists, and publics) to come to understand the role we all have in developing and adopting technologies, the ways those technologies affect our personal relationships and our society more broadly, and the ways all technologies work as part of interconnected systems. The three "big ideas" of Nano and Society are a powerful way to engage visitors in learning about nanotechnology. They spark interest and enjoyment, demonstrate relevance by connecting science and engineering with society, and indicate some of the ways that new technologies may affect our lives.

Professional Resources and Training

In order to share the Nano and Society approach across the Network, and to ensure museum staff and volunteers were comfortable with the new approach and resources, NISE Net and ASU-CNS committed to providing a comprehensive range of professional development opportunities and resources.

In 2012–13, the project team offered multi-day, in-person professional development workshops in four locations across the United States. Around 100 professionals from 50 different organizations were invited to attend the workshop. The workshops were organized around the three big ideas. Following an introduction to the project goals and rationale, each unit included improv exercises designed to build facilitation skills and comfort related to open-ended conversations, practical experience learning and delivering Nano and Society conversations in small groups, and deeper exploration of one big idea as a large group. The workshops concluded with training in a Network practice known as team-based inquiry, which gave educators methods and tools to experiment with and identify facilitation techniques that support audience engagement and learning (Pattison et al. 2014).

FIGURE 5. Educators and scientists learn an improv exercise that develops their facilitation skills. *Photo by Emily Maletz, courtesy of the NISE Network.*

Workshop participants were provided with physical kits they could use to do a similar training with their own staff and volunteers and to implement the activities with audiences at their home organization. The training kits included sample training agendas; an overview slide presentation explaining the rationale for exploring the social dimensions of technologies in an informal learning setting; short, humorous videos exploring the big ideas; guides for a set of improv exercises to strengthen essential skills; team-based inquiry tools; and physical materials and supplies to try out and implement a series of Nano and Society conversations. While the Nano and Society project used a "train-the-trainer" model, completely faithful implementation of the workshop, or the conversation activities, was not essential; it was more important that participants implemented the resources in a way that was appropriate, sustainable, and empowering for their institution and audiences.

The project also built in several follow-up opportunities for workshop participants. There were two online sessions scheduled soon after the in-person workshops, designed to support museums as they began to train additional staff and volunteers and implement the programming. The first online session oriented museums to their physical kits and the resources they contained and was intended to prepare the participants from the in-person workshop to train other educators at their organization. The second online session provided an opportunity to discuss facilitation strategies with peers and was intended to allow educators to share their experiences and insights as they began having Nano and Society conversations with public audiences. Finally, NISE Net's Network-Wide Meeting offered an additional in-person opportunity for workshop participants to reconnect and share their learnings with others.

After the initial series of workshop trainings, all the Nano and Society materials were made available online for free download (Sciencenter et al. 2012), and additional Nano and Society trainings were offered online and in other Network meetings. As with all Network resources, the Nano and Society materials are open source and distributed through a Creative Commons license, and Network partners are encouraged to adapt them to fit their mission, educational setting, and local audiences.

Project Impact

The Nano and Society project has had a great impact on the NISE Network community. The products and professional practices developed by the project are widely used, with partners across the United States engaging multiple and diverse public audiences in conversations about technology and society.

Nano and Society has been studied in terms of professional learning, public learning, and research-to-practice partnerships. As a capacity-building project, it was included in the Network's professional impacts summative evaluation study (Goss et al. 2016). Nano and Society public educational activities were incorporated into a variety of Network products, and their public impacts are assessed as part of the overall summative evaluation of those products (see Kollmann et al. 2015; Svarovsky et al. 2013; Svarovsky et al. 2014). Finally, the project was included as a case in a research study that examined how complex science ideas are made accessible to public audiences through research-to-practice partnerships between university scientists and museum professionals (Lundh et al. 2014).

NISE Net's logic model articulates the Network's overall theory of change. Essentially, the Network achieves public impact through the efforts of our institutional partners, including museums, universities, and other organizations committed to informal STEM education. The Network provides professional development and educational products to our institutional partners. Staff and volunteers implement these resources, establishing additional local partnerships and engaging local public audiences. Thus, the direct impact of the Network (and efforts such as Nano and Society) is on our professional partners, and the indirect impact is on the public audiences they engage (see Bequette et al. 2017, 15–17).

Consistent with the Network logic model, the Nano and Society project's primary goal was to increase the capacity of informal educators to engage public audiences in learning about the social dimensions of nanotechnologies, with the expectation that they would then implement conversations with their local audiences. The project addressed two related professional impact goals for the Network: by participating in the Network, professionals would (1) understand theories, methods, and practices for effectively engaging diverse public audiences in learning about nano; and (2) utilize professional resources and educational products for engaging diverse public audiences in learning about nanoscale science, engineering, and technology.

The NISE Network Professional Impacts Summative Evaluation is a longitudinal study of individual professionals, primarily working at museums and universities, over the final three years of the Nanoscale Informal Science Education Network (project years 7-10) (Goss et al. 2016). The study explored how involvement with NISE Net impacted professionals' sense of community, learning about nano, and use of nano educational products and practices. It employed two data collection methods over three years: an annual partner survey that involved a total of 597 professionals, and yearly interviews with a representative subset of 21 professionals (Goss et al. 2016). Within the study, the Nano and Society project was considered in terms of the two relevant professional impact goals described above: the degree to which Network partners adopted the professional practices it represented, and the degree to which they used the professional resources and public products it distributed.

The evaluation team found that over the study period, professionals reported becoming more confident in Nano and Society concepts and increased the extent to which they attributed that confidence to NISE Net. The percentage of professionals who reported using Nano and Society practices for engaging the public grew, and individuals reported increasing the amount of time they focused on societal and ethical implications of nanotechnologies with their audiences. By the end of the funded project period (year 10), 83 percent of all Network professional partners engaged the public in Nano and Society content. Of these, 94 percent used Network resources (Goss et al. 2016, 65–66, 72, 95–96). Half of the study

respondents in the final study year (project year 10) also reported using Nano and Society ideas to engage audiences in learning about other STEM topics, transferring the skills and techniques they had learned to other aspects of their work (Goss et al. 2016, 98–99). These findings are particularly impressive when compared to evaluation results prior to the Nano and Society effort (project year 5), when only a small percentage of Network partners engaged public audiences in learning about the societal and ethical implications of nanotechnologies (Kollmann 2011).

The professional impacts summative evaluation also offers some potential explanations for why Nano and Society practices and products had a large impact on the Network, while others promoted by the Network were used less extensively. The authors note that in conceiving the Nano and Society project, Network leadership took into account the summative evaluation of related previous work; a team was assigned to learn about partners' barriers and needs with regard to this challenging content, and new partnerships were established and substantial resources were dedicated to acting upon this information (Goss et al. 2016, 93). A full suite of professional resources helped professionals learn conversation practices, train others at their own organization, and share their results across the Network. A group of educational products, specifically designed to be integrated into activities Network partners already engaged in, provided concrete opportunities to implement Nano and Society ideas and practices immediately (Goss et al. 2016, 100).

The NISE Net Years 6-10 Evaluation Summary Report (Bequette et al. 2017) provides additional insight, identifying some of the general strategies that helped the Network to build the capacity of the field to do programming related to nanoscale science, engineering, and technology (including Nano and Society conversations). One successful strategy was creating educational products that model and embed best practices through their design, helping to ensure successful public learning outcomes and professional learning through implementation (Bequette et al. 2017, 44–45). Another important strategy was providing professional development opportunities that allow for deeper learning and sharing of ideas and expertise among Network partners (Bequette et al. 2017, 46–47).

Since 2013, Nano and Society concepts and conversation activities have been integrated throughout the Network's educational products, including our most widely distributed and used materials: NanoDays kits of hands-on activities and the *Nano* small footprint exhibition. Because Nano and Society is now embedded into much of our public engagement work, the Network does not have data on the number of people who participated in Nano and Society conversations specifically. We do know that as of 2015, over eleven million people each year participate in NanoDays and the *Nano* exhibition which both incorporate Nano and Society conversations and concepts (Svarovsky et al. 2015; see also Kollmann et al. 2015). In addition, many Network partners are applying the practices and tools they have learned (such as improv exercises to train staff in facilitation techniques) to other content areas and work at their own institutions. And finally, the Network leadership and development teams continue to use Nano and Society ideas, models, and strategies for new projects that focus on a variety of STEM fields, further extending the impact of the project.

Conclusions

Science centers, children's museums, and other informal science learning organizations are increasingly finding ways to connect with our communities and make the experiences we offer more relevant to our audiences' lives. By incorporating participants' own perspectives into their learning experiences and by fostering productive social interactions, we hope to make museum learning opportunities more impactful and engaging for our audiences. At the same time, professional organizations and funding agencies seek to encourage dialogue among scientists, engineers, policymakers, and people everywhere in order to help understand and solve a variety of pressing global and local issues. As institutions that are trusted by all of these parties, informal learning organizations provide an important venue for these conversations, fostering civic engagement and dialogue.

Through Nano and Society and subsequent projects, NISE Net partners are working together to encourage multidirectional dialogue among community members, educators, scientists, and others. In Nano and Society conversations, insight occurs when participants think about the people that imagine, create, and decide to use

technologies. They come to understand the role we all have in developing and adopting technologies, and the ways that those technologies affect our personal relationships and our society more broadly. Ultimately, Nano and Society conversations can help people feel empowered to make and contribute to decisions about new and emerging technologies.

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