

Storytelling and making meaning about engineering practices

Designing Our Tomorrow research

Engineering practices for communities

The *Designing our Tomorrow* (DOT) project focuses on exercising engineering learning in an informal museum environment for girls 9–14 and their families such that the engineering learning is useful for helping them achieve their own goals. In this project, engineering is recognised as something people and communities are already doing (Randol, S. M., Herrán, C., Ramos-Montanez, S., Shagott, T., Benne, M. R., 2021).

This DOT research looked at storytelling approaches parents and educators used to communicate to other parents and educators that the engineering practices exercised at DOT exhibits are usefully relevant to problem-solving in their day-to-day lives and their communities.



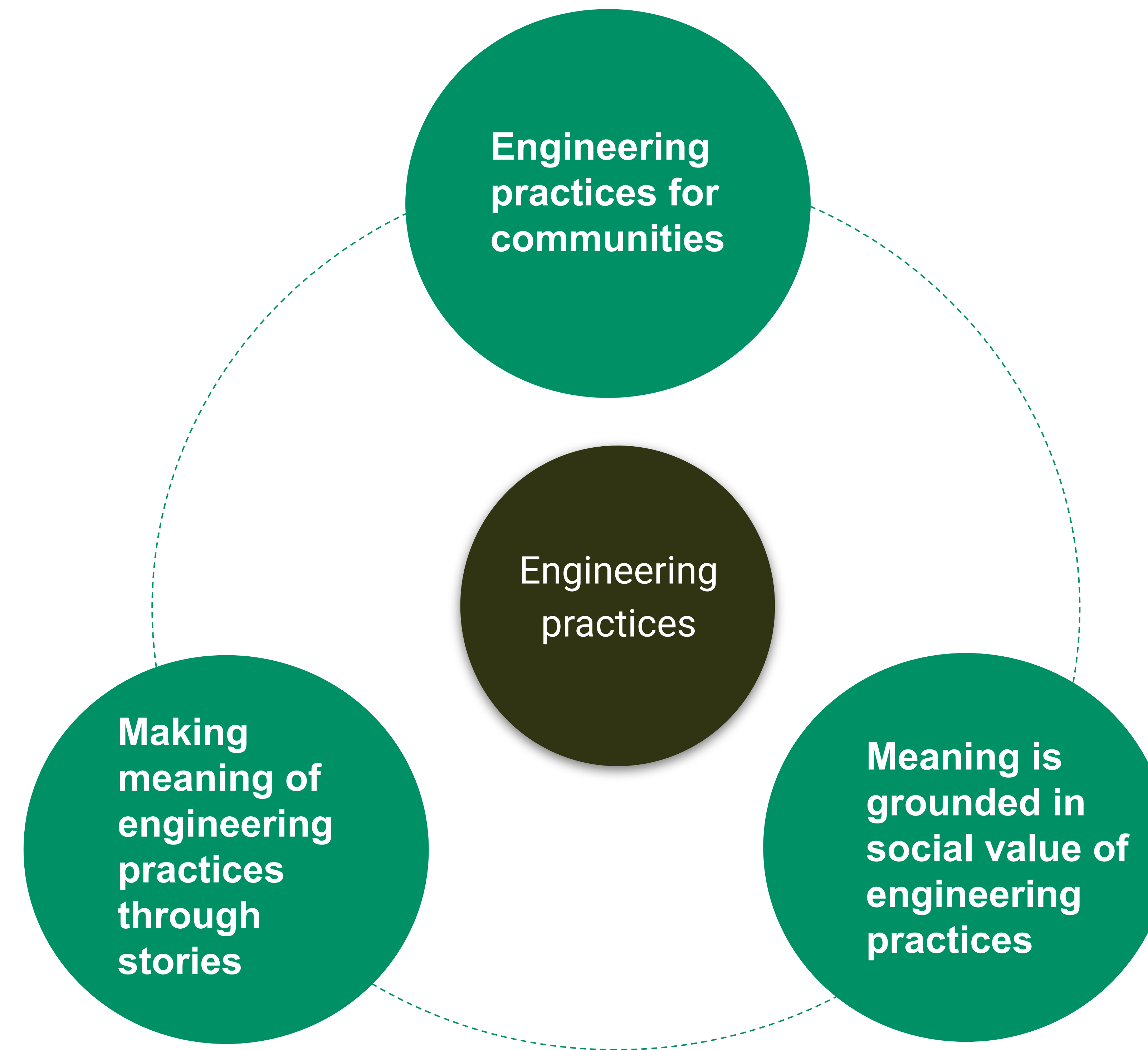
DOT Storytellers

Making meaning through stories

Sometimes science center staff and materials communicate from an expert-oriented, top-down, or unidirectional manner. The DOT project and this research worked on communications founded in community member and participant perspectives.

This research recognized that caregivers and their families often make sense of their world by sharing stories with each other (Gottschall, J., 2012).

By grounding this asset-based study in a communication ecology framework with a constructivist lens, the research team explored ways in which storytelling and conversation as communication approaches generated sense-making and connections (usefulness relevance) about engineering practices in their lives (Dervin, B., 2003; Kotkas, T., Holbrook, J., Rannikmae, M., 2016; Priniski, S., Hecht, C., & Harackiewicz, M., 2018).



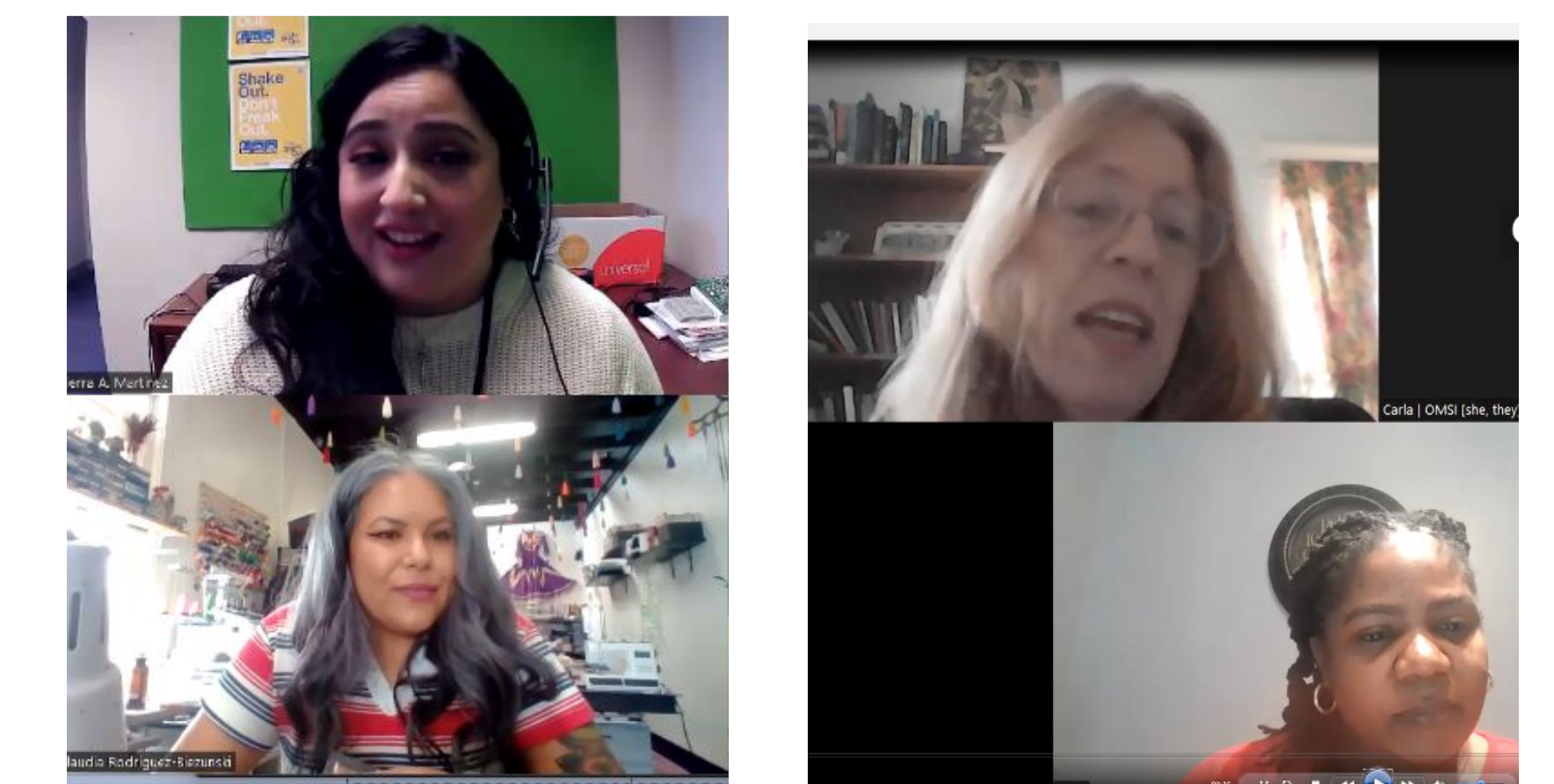
Engineering practices and community

“...In my day to day life, you have a group or assign tasks to everybody. It is better when it becomes a group, team effort... We do need a community, we do need a group of people to help each other out to make it a better outcome. The yield needs more corn, more beans, whatever it is, we have a better outcome with when we communicate or stick as a group.”

~Yesenia, Active Audience Member

“I think that's what they need is hope to be able to find and start from there [brainstorming]. ... We make food during the holidays and go hand it out...and there is time, you just have to manage everything differently. ...It's really nice and warming to see their faces when they do get a home cooked meal and blankets,... just necessities that we all take for granted... in our home. But we need to think outside the box.”

~Maria, Active Audience Member



DOT Storytellers and Active Audience Members

Collaborative Practices at Interactive Engineering Challenge Exhibits (C-PIECE)

Randol, S., Benne, M., Herrán, C., Ramos-Montañez, S., Shagott, T. (2023)



HELMET DROP EXHIBIT affords
Design preparation practices

- Consider benefits and trade-off of materials
- Brainstorm ideas
- Discusses/plans design other than materials

Testing practices

- Tests specific variables
- Completes multiple iterations • Continues testing

These practices are also exercised IN COMMUNITY when:
Testing types of water faucets for least likely to leak or waste water



KINETIC KITES EXHIBIT affords
Goal Orientation practices

- Discusses questions/ideas about the process with others
- Identifies/describes criteria or constraints
- Defines problem within context

Design Modification practices

- Focuses on problematic subsystems
- Brainstorms ways to make successful prototype better
- Optimizes design and materials

These practices are also exercised IN COMMUNITY when:
Trying to increase composting at schools, businesses, and event spaces

Meaning is grounded in social value

Participants in the storytelling and conversation sessions generated connections to and examples of engineering practices they use in their day-to-day lives and their communities, such as their jobs, child's school, church, and extended family.

These connections seem congruent with the utility community value definition (Brown et.al, 2015) and altruistic potential of engineering (NAE, 2008), in which an activity is perceived as valuable as long as it includes other people or groups of people by working, collaborating or forming bonds with them.

