

Measuring the Impact of an Informal Science Education Program

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Project Motivation & Goals

Problem: Most informal science evaluations are limited to examining impact immediately following program participation

Our Goal: Examine **broader** and **long-term** impacts of a specific informal science learning experience

- We use the term **impact** to mean the **combined personal, community, and organizational outcomes** resulting from participation in an informal science experience
- Outcomes may either be **tangible** (i.e., in the form of papers, presentations, observable changes in populations, ecosystems, or relationships) or **internal** (i.e., identity, science affinity, confidence)

Conservation Training Partnerships (CTP)

- Place-based, environmental action program within UConn Natural Resources Conservation Academy (NRCA)
- Train **intergenerational teams** of **teens** and **adult volunteers** in **conservation science** and **geospatial technology**
- Teams identify and **address a local environmental issue** through their community conservation project
- 5-year program between 2017-2022:
 - 12 training workshops
 - 266 participants forming 118 teams
 - 86 completed community conservation projects



Personal Impacts

Cognitive

- Awareness/knowledge of concepts
- Skills (e.g., tech, communication, writing)
- Capacity building (e.g., tech usage)

STEM Identity

- Attitude toward nature, etc.
- Affective components
- Engagement & interest
- Sense of purpose

Behavior

- Behavioral changes/actions
- Enduring connectivity (future plans)

Watch our STEM for All Showcase video to hear CTP program participant perspectives: s.uconn.edu/ctp-impacts



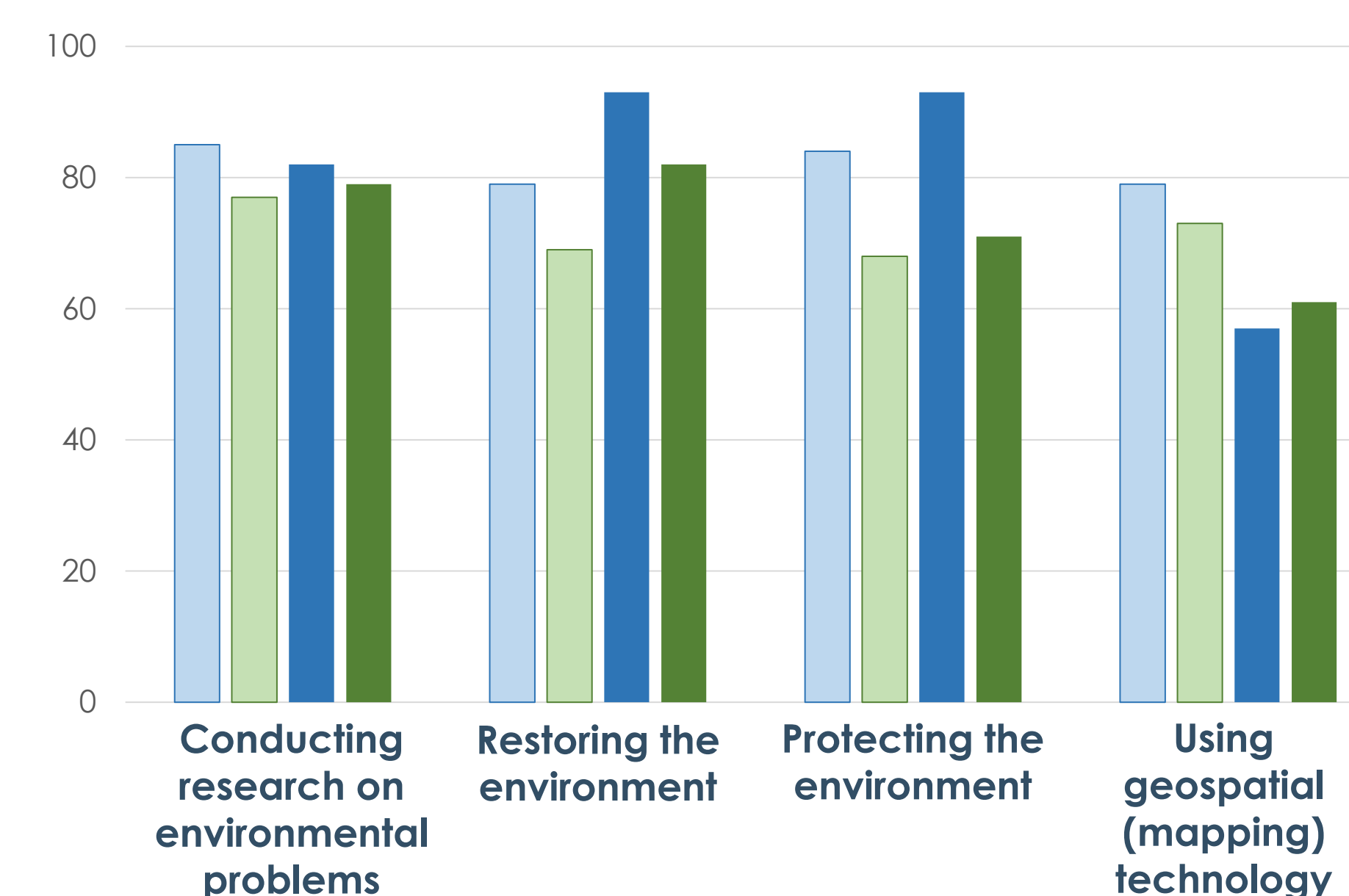
NRCA's Conservation Training Partnerships is funded by a grant from the National Science Foundation Advancing Informal STEM Learning program (AISL-1612650).

Project Overview

Methods

- HRI (external evaluator) administered an **online survey** to all adults and teens who:
 - Participated in CTP prior to 2021-22 cohort
 - Completed their conservation project
- Survey respondents included:
 - 40 adults (68% response rate)
 - 28 teens (50% response rate*)
- HRI also conducted **phone interviews** with 10 adults and 9 teens who completed the survey

Figure 1. Percent of adult (light) & teen (dark) respondents reporting a **substantial**[†] impact on their **interest** (blue) & **understanding** (green) in...



[†] Includes those indicating a 4 or 5 on a 5-point scale from 1 "Not at all" to 5 "To a great extent"

"It's made me very confident that I can do any projects like that... It's giving me skills like how to write an email, a proper email, and how to talk and do interviews and stuff and just a lot of professional skills." – CTP teen participant

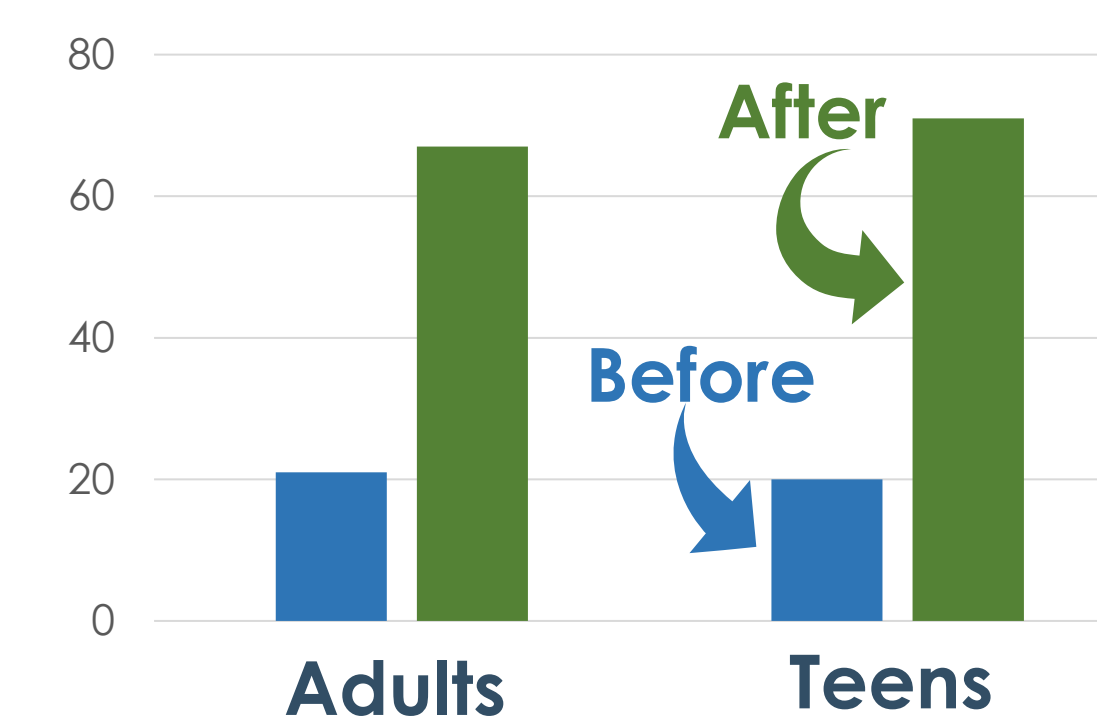
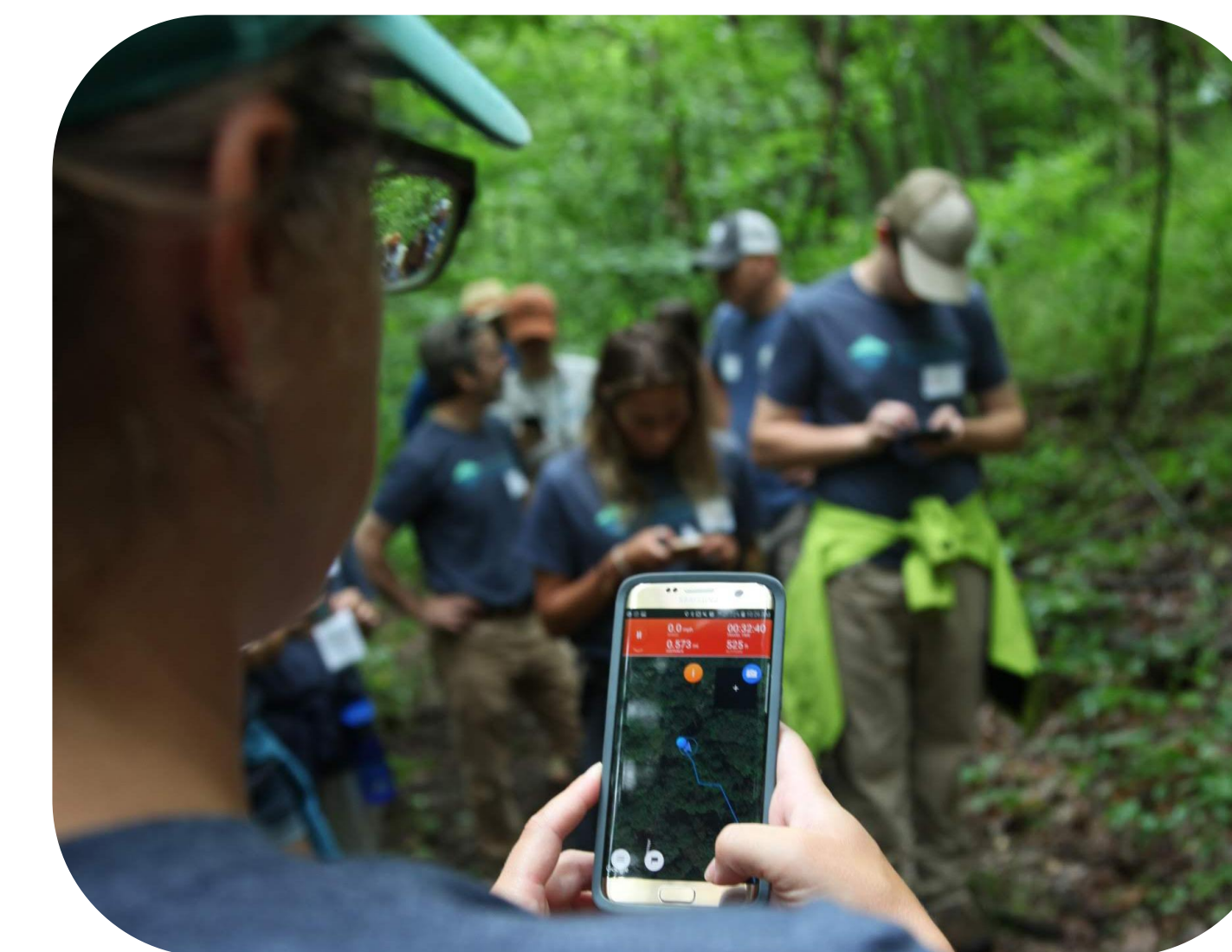


Figure 2. Perceptions of preparedness to use geospatial technologies before and after participating in the CTP program



"It wasn't the adult, the kid. That's the thing that I really came away with... We did great as far as sharing responsibilities and respect for one another." – CTP adult participant

*Due to the relatively low response rate, results are not necessarily representative of all participants and should be interpreted with caution.

Findings

- Majority of adult & teen survey respondents indicated CTP **increased their interest and understanding** of environmental topics and geospatial technology (Figure 1)

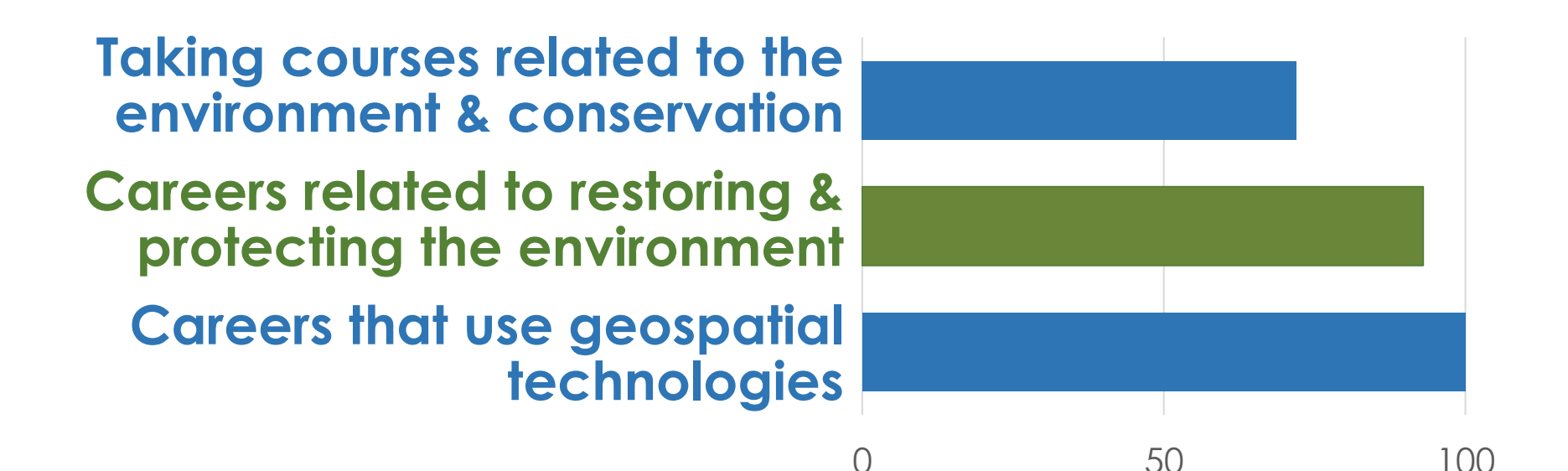
Adults

- How to use technology; confidence to use technologies in the future
- Environmental issues were relevant

Teens

- CTP expanded their understanding of what they considered conservation
- Working with a team on their own project
- Most adult & teen interviewees reported **using geospatial technologies since CTP**
 - Personal (hiking, birdwatching)
 - Work (teaching, environmental programs)
 - Research projects in high school or college

Figure 3. Percent of teens (N=28) who responded Agree or Strongly Agree that CTP increased their interest in...



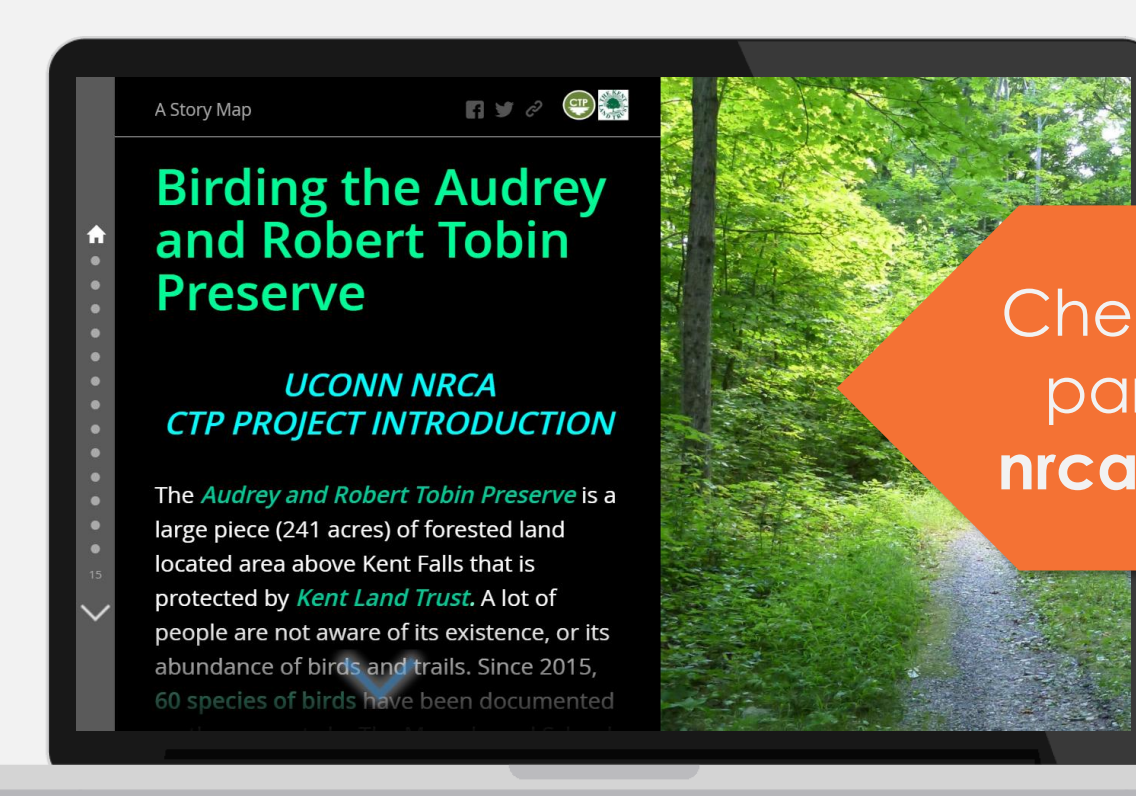
Community & Organizational Impacts

Community

- Interpersonal relationships, mentorship
- Development of community of practice
- Cultural changes
- Enduring group connectivity
- Environmental population/habitat change

Organizational

- Instrumental (resources, physical products, etc.)
- Environmental policy change



Check out all past NRCA participant projects @ nrca.uconn.edu/projects

Conclusion & Future Directions

Main Take-Aways

- Survey and interview evidence illustrate **broad** and **long-term positive impacts** of the CTP informal science program
- These impacts include numerous **personal, community, and organizational** outcomes for many former teen and adult CTP participants

Next Steps

- Continue developing conceptualizations for measuring impact in informal science learning
- Application of developing framing in subsequent iterations of CTP

Acknowledgements & Resources

Thank you to Joan Pasley and Anna Bruce from HRI and our CTP colleagues and program participants.

Rodriguez et al. 2020. Conservation science and technology identity instrument: Empirically measuring STEM identities in informal science learning programs. *School Science and Mathematics*
 Campbell et al. 2021. Intergenerational community conservation projects, STEM identity authoring, and positioning: the cases of two intergenerational teams. *International Journal of Science Education, Part B*
 Cisneros, Simmons & Campbell et al. 2021. Program design principles to support teen-adult community conservation efforts. *Frontiers in Education*
 Rodriguez et al. 2021. Assessing STEM identities in Intergenerational Informal STEM Programming. *Contemporary Issues in Technology and Teacher Education*
 Simmons et al. 2022. "Part of our DNA": intergenerational family learning in informal science. *International Journal of Science Education, Part B*

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