

Citizen science sparks independent scientific investigations

ABSTRACT: Citizen science programs across the country invite the public to participate in scientific research. Through these experiences, participants learn scientific data collection protocols and have opportunities to observe nature, which naturally leads to asking questions about the natural world. A new project in Minnesota is **training leaders of youth groups to use citizen science experiences to stimulate curiosity** and inspire motivation to design and carry out scientific research projects. This unique program model fosters authentic inquiry in youth age 10-14 outside the traditional school setting, such as 4-H clubs, scout groups, or community youth programs. In the first two years of the five-year, NSF-funded project, 186 youth were served in 22 research teams.

Driven to Discover: Inquiry in nonformal settings

During the first two years of the five-year project, participants met regularly with their research teams in parks, schools and other areas to collect citizen science data. Individuals and small groups of youth posed questions based on phenomena experienced during these meetings, then carried out an original inquiry project. All research teams were invited to present their investigations in Fall Research Summits.



OBSERVE

Participating in citizen science projects provides opportunities for youth to observe natural phenomena. Journaling exercises help focus observations and stimulate reflection.



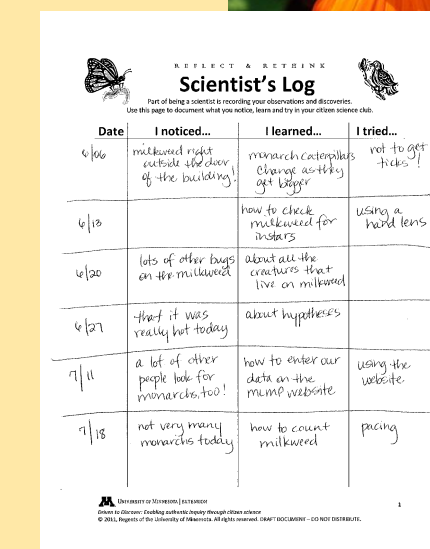
QUESTION

Observations naturally trigger curiosity. Youth document questions on an “I Wonder” board, then learn to convert their questions into descriptive, comparative, or correlative questions ready for testing. Mentoring by professional scientists increased participants’ science confidence and exposed youth to science careers.



INVESTIGATE

Youth identify the possible answers to their research question, then design an investigation to gather evidence to support or refute one of their hypotheses. Youth analyze their data and communicate their findings to each other at a state-wide Research Summit in the Fall.



Youth attitudes towards science

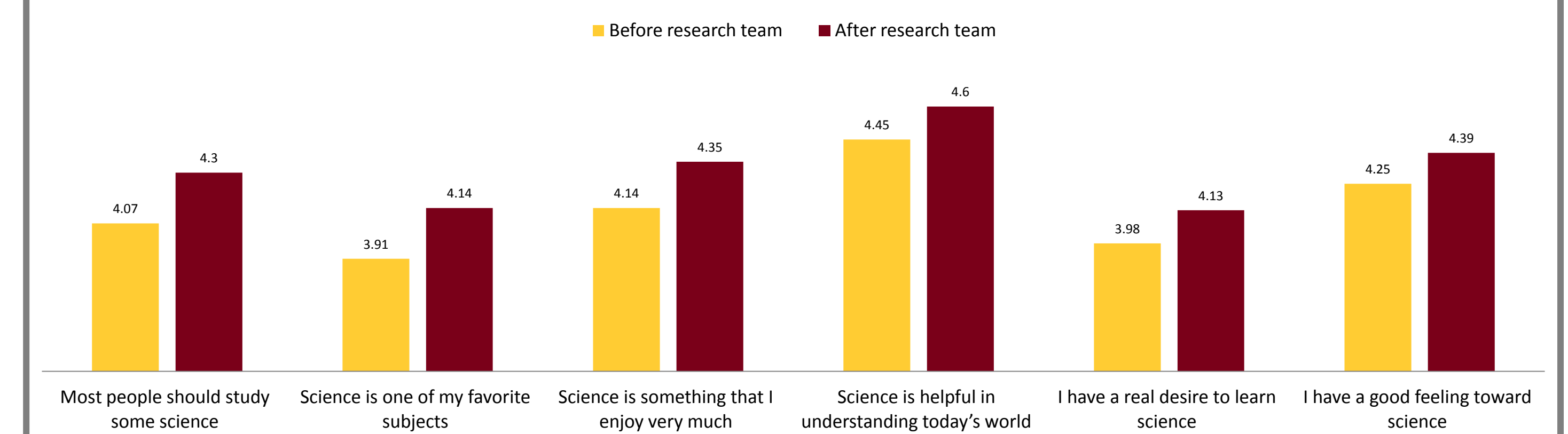


FIGURE 1. n=176 Scale: 1= Strongly Disagree, 5=Strongly Agree

Leader Confidence

Q: How confident do you feel with facilitating youth in science inquiry?

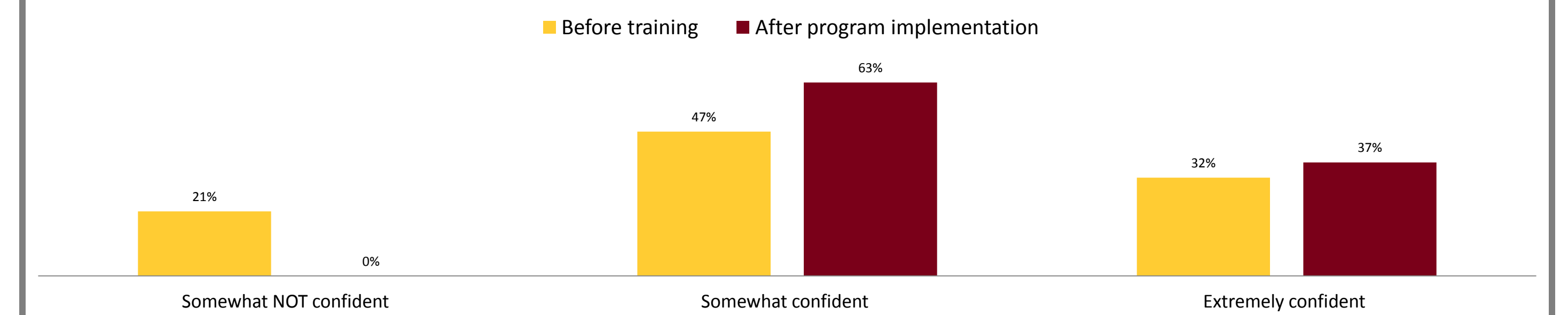


FIGURE 2. n=19

Challenges for Phase 2:

- Preparing volunteer leaders with technical content
- Preparing research teams to transition from citizen science to inquiry
- Creating focused summer learning atmosphere
- Accommodating multi-age youth and family relationships within the research teams

FORMATIVE EVALUATION RESULTS: Preliminary evaluation of years one and two of the project has shown that the program model leads to changes in skills, attitudes and behaviors of both youth and adult participants (See figures 1 and 2 above). End-of-season focus groups confirmed that many club leaders increased their skills and confidence in facilitating youth inquiry. Pre-Post assessments indicated positive club leader behavior change in requiring youth to design investigations, evaluate data, and explain using evidence. Many participating youth presented their research projects at a Research Summit we host each fall, and many took these projects to regional science fairs. Of the project youth who presented their projects at regional fairs, 91% advanced to the state science fair, compared to 14% of total regional participants, suggesting that involvement in the program had a strong positive impact on project quality.

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