Scientific knowledge and attitude change: The impact of a citizen science project

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Program Profile	
Program Description:	The Birdhouse Network (TBN) was one of the Cornell Lab of Ornithology's citizen science projects. Participants volunteered for the project, paying a small fee for materials and the opportunity to participate. TBN studied cavity-nesting birds (e.g., bluebirds, tree swallows, and American kestrels). Participants put up one or more birdhouses in their yards or neighborhoods, observe them, and report data on these nest boxes. One or more of four different protocols was followed in data gathering: the clutch size of each nest, calcium intake by the birds, feathers used in the nests, and nest site selection. Data were returned to TBN, compiled, and used for research and scientific publication.
Program Goals:	Cornell Lab of Ornithology: -To increase participants' knowledge about science and the scientific process -To change participants' attitudes towards science and the environment -To gather large sets of data based on participants' observations, and use these data for research published in peer-reviewed journals The Birdhouse Network: -To study cavity-nesting birds such as bluebirds, tree swallows, and American kestrels -To have participants put up one or more next boxes in their yards or neighborhoods -To have participants observe and report data on the nest boxes and their inhabitants while following one or more of four different protocols focusing on the clutch size of each nest, calcium intake by birds, feathers used in nests, & nest site selection
Program Funding:	The majority of funds received were from the Informal Science Education Program at the National Science Foundation.
Program Links:	The Birdhouse Network: http://www.birds.cornell.edu/birdhouse Cornell Lab of Ornithology: http://www.birds.cornell.edu/
Evaluation Profile	
Evaluation Goals & Questions:	This evaluation was designed to examine the extent to which: 1. Participation in the The Birdhouse Network (TBN) citizen-science project resulted in positive effects on the knowledge of bird biology among adult participants 2. Participation in the TBN citizen-science project resulted in increased knowledge of the understanding of the nature of scientific inquiry among adult participants 3. Participation in the TBN citizen-science project resulted in positive effects on attitudes toward science and the environment among adult participants
Evaluation	This summative evaluation used a pre and post-test non-equivalent groups design.

Methods:	Participants received a pre-test before receiving TBN educational materials and protocols, and a post-test at the end of the field season. Sampling procedures differed for the pre-test and post-test. A non-random sampling of the first 300 participants to sign up was chosen for the treatment pre-test. The treatment post-test was given to 200 randomly chosen participants who had received the pre-test and 200 randomly chosen participants who had not received the pre-test. The pre-test control group consisted of a random sample of 400 Cornell Lab of Ornithology members who were not participants in the TBN or any other of the Lab's citizen-science projects. The post-test control group consisted of a new set of 400 Lab members who had not received the pre-test. Mail packets consisting of a cover letter, survey instrument, and stamped, addressed return envelope were distributed to the pre- and post- groups. The instrument consisted of measures developed by TBN and from existing scales. These measures were designed to assess knowledge of bird biology conveyed by TBN project materials attitudes toward science (adapted from NSF's attitudes toward organized science scale (ATOSS) and attitude toward the environment (from the new environmental paradigm (NEP) scale, and a closed-ended and open-ended question to measure understanding of the scientific process. The survey instrument also included items to obtain demographic information.
Evaluation Instruments:	A partial set of evaluation instruments is available in the report.
How were results used?	The evaluators arrived at the conclusion that no existing survey instrument is sufficient to evaluate the kinds of impacts from citizen science projects that the evaluation team had hoped to measure at the outset. This conclusion has been used to inform the focus of future research that aims to develop meaningful evaluation instruments that measure the impacts of citizen science projects.
Evaluation Cost:	Information not available.
Evaluation Insights:	**In terms of evaluation, what were the important "lessons learned"?** The main lesson of this evaluation was that no existing survey instrument is sufficient to evaluate the kinds of impacts from citizen science projects that the evaluation team had hoped to measure at the outset. **What worked well?** It proved fruitful to avoid assuming prior knowledge of program participants. For instance, it was initially assumed that the vast majority of lay citizens knew that the term 'nest box' is synonymous with 'bird house'. A small survey of 100 lay citizens was performed, and only 3 out of 100 were familiar with the term 'next box'; program language was changed to reflect this new understanding of lay citizens' base knowledge. **What could have been done differently?** Obtaining more in-depth qualitative research prior to the program evaluation would have been helpful to refine evaluation instruments. Additionally, to further assess prior knowledge of participants, it may have been useful to pre-test program participants to assess how thoroughly research packets sent to their homes before the citizen science project began had been read and digested.
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