



MULTIMEDIA RESEARCH

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Contribution of Multimedia to Girls' Experience of Citizen Science

Summative Evaluation of *SciGirls* Season Three



Report for
Twin Cities Public Television
by
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Report No. 15-005
December 3, 2015

ACKNOWLEDGEMENTS

This work would not have been possible without the support and contribution of the staff of the Association of Zoos and Aquariums and their *FrogWatch USA* chapter coordinators and leaders at Fort Wayne Children’s Zoo; Greenville Zoo; Hiram College; Nashville Zoo/Owl’s Hill Nature Sanctuary; and Roger Williams Park Zoo. Contributing to development of scales were grant partner Cornell Lab of Ornithology; NASA S’COOL staff and fifth grade S’COOL citizen science participants in CA, NC, and FL; and additional fifth grade girls in science classrooms in CA, FL, GA, PA, and TX. The evaluation design, methodology and final report benefited from reviews by grant advisors, staff of Twin Cities Public Television, and colleagues at Knight Williams Inc. and Rockman et al. The evaluation team included Alice Bernard, Karen Bernard, Sandra Crow, Lauren Fujii, Debra Klich, Laura Minnigerode, and Patricia Sullivan-Hall. We are also most grateful for the participation of the fifth grade girls and their parents in the multimedia enrichment experience and evaluation process.



This material is based on work supported by the National Science Foundation under Grant No. 1323713. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author and do not necessarily reflect the views of the National Science Foundation.

EXECUTIVE SUMMARY

Produced by Twin Cities Public Television, St. Paul, MN, and sponsored by the National Science Foundation, *SciGirls* (Season Three) is a multimedia project that presents videos and games designed to engage and educate millions of children about citizen science. Multimedia Research, an independent evaluation group, implemented a summative evaluation that assessed a model of citizen science engagement and education that examined the contribution of *SciGirls* multimedia to preteen girls' experience of citizen science.

In the evaluation's mixed-methods experimental design, fifth grade girls at five nationally distributed sites were randomly assigned to one of two groups: A treatment group (n = 49) that experienced 2 hours of *SciGirls* multimedia at home followed by a 2.5 hour live citizen science session; or a control group (n = 49) that experienced the live citizen science session without prior exposure to *SciGirls*. Prior to beginning the evaluation, the two groups were equivalent in their interest in nature and science ratings.

In the *SciGirls* experience, participants viewed three half-hour videos in which female mentors guide different groups of middle school ethnically diverse girls as they learn about citizen science protocols and collect and share data. Participants also played two games supporting the citizen science experience.

For the evaluation's live citizen science session, *FrogWatch USA*, a project of the Association of Zoos and Aquariums, was chosen to represent the field of contributory model citizen science and is one of the six citizen science projects covered by *SciGirls* multimedia. In a *FrogWatch USA* session, participants engage in citizen science by learning to identify calls of frogs and toads and collect data in community wetlands, adding to a publicly accessible database.

Drawing on research in interest development, sources of self-efficacy, and multiple platform learning, the summative evaluation examined how *SciGirls* multimedia enrichment contributes to fifth grade girls' (1) interest in the *FrogWatch USA* session and citizen science generally, (2) self-efficacy in the *FrogWatch USA* session and citizen science generally, and (3) learning about the practice of citizen science. Data collection methods included post surveys with quantitative rating scales and open-ended questions as well as individual post interviews.

Key Findings

The treatment group demonstrated significantly higher levels of interest than the control group in their *FrogWatch USA* session. Both treatment and control groups rated their quantitative interest in *FrogWatch USA* very high, but prior exposure to *SciGirls* multimedia successfully triggered more interest for the treatment group. Treatment girls felt that their interest increased because the *SciGirls* videos and games prepared them for the *FrogWatch USA* session, showed them that *FrogWatch USA* would be fun, and explained why citizen science data collection is important.

Both treatment and control groups were moderately interested in finding out more about other citizen science projects and somewhat likely to look for another citizen science project to do in the future. The two groups did not differ significantly in their quantitative interest ratings of pursuing more citizen science beyond *FrogWatch USA*. Girls who reported interest in other citizen science projects explained that they were influenced by *SciGirls* videos that showed how girls like themselves could participate in citizen science and that portrayed how fun citizen science is.

Treatment and control groups displayed equal and high self-efficacy ratings with respect to their *FrogWatch USA* session and other citizen science projects. Treatment girls who reported positive self-efficacy ratings felt that they did better in their *FrogWatch USA* session and would do a good job in a different citizen science project because they saw girls like themselves successfully participating in both *FrogWatch USA* and other projects. They felt that *SciGirls* multimedia prepared them in advance for the frog content and activities and also showed them the process of other citizen science projects.

The treatment group demonstrated significantly better understanding than the control group of the unique practice of citizen science. Exposure to *SciGirls* multimedia helped treatment girls understand the features of the practice of citizen science: that anyone can participate; that participants use the same protocol so data can be combined and be high quality; that citizen science data can help real scientists come to real conclusions; and that citizen science brings together a wide community of scientists and volunteers to work together and share data to which the public, as well as scientists, have access.

Within the treatment group, pre-exposure to *SciGirls* produced a significantly stronger impact on minority girls than non-minority girls. By stratified random assignment, treatment and control groups included equal percentages of minorities (38%), comprising African American, Latina, Asian and multiethnic girls. Within the treatment group, minority girls (n = 18) produced significantly stronger results compared to non-minority girls (n = 31). These findings must be qualified by the small sample size, but minorities displayed higher interest in their *FrogWatch USA* session, higher interest in finding out more about other citizen science projects, greater likelihood to look for a future citizen science project to do, greater perceived efficacy in doing other citizen science projects, more similarity to the video girls, and stronger interest in their *SciGirls* experience.

Recommendations

Each of the six citizen science projects highlighted in a *SciGirls* video should consider utilizing *SciGirls* multimedia prior to citizen science sessions with preteen girls. For logistical reasons, *FrogWatch USA* was chosen to represent the contributory model citizen science projects covered in the *SciGirls* videos. Besides *FrogWatch USA*, highlighted projects in *SciGirls* include Celebrate Urban Birds, Monarch Larva Monitoring Project, Student Cloud Observations Online, Nature's Notebook, and Seafloor Explorer. Although each of these projects has unique elements, we can generalize from the summative evaluation findings that prior exposure of preteen girls to the *SciGirls* materials associated with a respective project can increase project interest, help prepare girls for their citizen science sessions, and improve understanding of citizen science practice.

Informal and formal educators working with preteen girls could use *SciGirls*' resources – video in particular – independently of specific citizen science projects to introduce the practice of citizen science generally and generate interest and participation in citizen science more broadly. Exposing young girls to the process and fun of citizen science via video will increase not only knowledge about citizen science, as demonstrated by the evaluation's results, but also might stimulate participation in projects not highlighted in the videos.

The differential impact of *SciGirls* on minority girls' interest and efficacy should encourage researchers to explore these issues with larger samples. Further research might focus on ethnically diverse or homogeneous groups and collection of a much wider variety of background information to shed more light on how peer-oriented multimedia influences youth outcomes, how minorities might respond differently to contributory model citizen science, and how groups differ in their pathways of science interest and self-efficacy.

To contribute to potential comparisons across citizen science and science programs more generally, the Girls' Interest in Nature and Science Scale (GINSS), developed and validated as part of the summative evaluation, is available for use by other evaluators and researchers (see Appendix A).

In conclusion, the *SciGirls* multimedia experience contributed significantly to girls' experience of citizen science. Exposure to *SciGirls* triggered interest that was carried into a subsequent citizen science session and increased preteen girls' understanding of the unique practice of citizen science, with a special influence on minority girls' interest and self-efficacy. *SciGirls* multimedia shows youth the process and practice of citizen science, demonstrates the fun of citizen science, and presents peers with whom girls can identify. Incorporating multimedia is recommended as an effective method for influencing girls' citizen science interest, self-efficacy and learning.