

Findings from a Five-Year Evaluation of the Planetary Science, Science Education and Public Outreach Forum. S. M. Shebby¹, S. Shipp², and S. R. Buxner.³ ¹McREL International, 4601 DTC Blvd., Suite 500, Denver, CO 80237, sshebby@mcrel.org. ²Planetary Science Institute, 1700 E. Ft. Lowell Rd., Suite 106, Tucson, AZ 85719, shipp@lpi.usra.edu. ³Planetary Science Institute 1700 E. Ft Lowell, Suite 106, Tucson AZ 85716 buxner@psi.edu.

Introduction: The National Aeronautics and Space Administration (NASA) Science Mission Directorate (SMD) has the following vision for Education and Public Outreach (E/PO):

“To share the story, the science, and the adventure of NASA’s scientific explorations of our home planet, the solar system, and the universe beyond, through stimulating and informative activities and experiences created by experts, delivered effectively and efficiently to learners of many backgrounds via proven conduits, thus providing a direct return on the public’s investment in NASA’s scientific research” [1].

In part, SMD supports this vision through the work of the four Science Education and Public Outreach Forums (SEPOFs): Astrophysics, Earth Science, Heliophysics, and Planetary Science. In 2009, the SEPOFs received a five-year grant to coordinate the work of the E/PO community—those who conduct E/PO activities using SMD content, expertise, and facilities, such as mission and program staff, contractors, and grantees.

The Planetary Science SEPOF: The Planetary Science SEPOF works to support grantees to more effectively, efficiently, and sustainably communicate information about and utilize SMD science discoveries and learning experiences, via three goals:

- Goal 1: The SMD E/PO community is engaged and leveraging SMD E/PO resources, expertise, and best practices relevant to their E/PO efforts. External science and education communities are engaged in SMD E/PO.
- Goal 2: The SMD E/PO portfolio is organized and catalogued for accessibility, connectivity, and strategic growth.
- Goal 3: A NASA SMD E/PO infrastructure provides the means for coordination across SMD and with NASA E/PO.

We will describe preliminary outcomes of the work of the Planetary Science SEPOF to increase the coherence of E/PO work.

Evaluation Design: We will share findings from and information about our experience in evaluating the efforts of the Planetary Science SEPOF in meeting the above goals. This includes formative (information about how activities are perceived by program participants and whether of activities are likely to achieve the program’s goals) and summative (information about whether the program achieved its intended goals) eval-

uation support. Traditional indicators (such as the number of participants or Likert-type ratings of participant perceptions) were used to provide stakeholders with basic information about program outputs; these indicators were complemented by use of qualitative methods to strengthen the reliability of quantitative data and provide stakeholders with more meaningful information about program challenges, successes, and ultimate impacts [2].

Mixed-methods evaluation. We used a mixed-methods evaluation to determine the impact of Planetary Science SEPOF, including five potential benefits of mixed-methods designs: triangulation of findings, development, complementarity, initiation, and value diversity [3]. We will describe different mixed-methods approaches and the factors we considered when choosing our mixed-methods design, such as selection of data collection methods and sources, the timing of quantitative and qualitative methods, and weighting of data [4]. We will also demonstrate how our “mix” of methods, including artifacts, surveys, interviews, focus groups, and vignettes, were selected to comprise the project’s evaluation design, providing specific examples of how alignment between the program’s logic model and the evaluation plan was best achieved with a mixed-methods approach.

Findings: The Planetary Science SEPOF is in Year 5 of its five-year grant. The evaluation team will present evidence describing the progress of the Planetary Science SEPOF toward its goals of engaging and developing SMD E/PO community and external science and education communities (Goal 1), assisting SMD in analyzing and organizing the portfolio of SMD E/PO products and project activities (Goal 2), and promoting the coordination of E/PO efforts both inside and outside of NASA SMD (Goal 3).

We will present formative and summative findings relative to each of the three Planetary SEPOF’s goals. For example, relative to Goal 1 we used closed-ended and open-ended survey items to gauge community members’ levels of engagement, awareness of resources, and satisfaction with the resources and opportunities provided. These data were provided to the Planetary SEPOF on an annual basis to inform the SEPOF’s activities (formative) and changes in perceptions were reported on over the five-year period (summative). Relative to Goal 2, we will explain how we

used interviews to describe how the SMD E/PO portfolio is organized (formative), surveys to learn about community members' perceptions of the portfolio (formative), and artifact analysis to inform whether the portfolio is organized and catalogued for accessibility, connectivity, and strategic growth (summative).

Findings can be used to inform the future work of the SEPOFs—and other entities which support E/PO providers—in building the capacity of their community members.

References: [1] National Aeronautics and Space Administration (NASA). (n.d.) Education & Public Outreach Program Strategy. Retrieved from <http://science.nasa.gov/researchers/education-public-outreach/strategy/>. [2] Stern, E; Stame, N; Mayne, J; Forss, K; Davis, R & Befani, B (2012) Broadening the range of designs and methods for impact evaluation. Department for International Development. [3] Greene, J. C., Caracelli, V. J., & Graham, W. D. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis*, 11(3), 255-274. [4] Creswell, J.W. (2003). *Research design: Qualitative, quantitative, and mixed approaches*. Thousand Oaks, CA: Sage.

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