

INFORMAL EDUCATOR NATIONAL SURVEY RESULTS

NASA SMD
Science
Education and
Public Outreach
Forums Informal
Education
Working Group

PURPOSE

- Needs-based survey to determine:
 - *How, when, where, and for how long* do informal educators prefer to receive science, mathematics, engineering, and/or technology content professional development?
 - What are the professional development and material resources that informal educators prefer that could be provided by current and future NASA SMD Education and Public Outreach (E/PO) efforts?
- The results of the survey will be used to help NASA's SMD E/PO community better meet those needs and plan future opportunities for the informal education community, in an effort to reach NASA SMD E/PO Objective 1.2: *Provide resources and opportunities to enable sharing of best practices relevant to SMD E/PO.*

THE AUDIENCE

Informal Education

Free-choice learning opportunities provided outside of the classroom, based on education standards or content-focused learning objectives, created and/or conducted by qualified informal education practitioners, benefitting people of potentially any age and promoting life-long learning.

THE AUDIENCE

A wide variety of informal education professionals that were representative of the informal education community as a whole and inclusive of those who *did not* have a prior relationship with SMD E/PO programs and those who *do*.

- Science/technology museums/centers
- Non-science museums/sites
- Parks
- Public libraries
- Community/afterschool centers
- Other, including other nonprofit
- Government agencies

RESULTS - WHO

A total of 1,073 educators responded to the survey:

- Most of the respondents (88%) were paid informal educators, with the small remainder identifying as volunteer (10%) or didn't report status.
- Majority indicate at least 6 years of experience (70%) with 42% having more than a decade.
- Roles included:
 - Front-line staff/implementer/interpreter
 - Program developers
 - Staff managers/decision makers
 - Trainers
 - Serve multi-roles, or un-named rolls

RESULTS – STEM PROGRAMMING

- The majority (90%) of respondents' institutions offer STEM programs at some point during the year
- Only ~26% report conducting STEM activities everyday with a correlation to institution type.
- STEM topic covered most widely is Earth Science
- STEM topics covered the least widely are Engineering and Mathematics
- Centers that report not offering STEM programs gave not having resources/materials on hand for STEM programs, STEM programs do not fall within their institutions' missions, and not having funding available to offer STEM programs as responses.

RESULTS – PROFESSIONAL DEVELOPMENT

Highest percentages reported:

- Participation is a required part of job duties.
- A preference for in person sessions that last up to one day in length and can be on a weekday that does not coincide with a holiday.
- Respondents from science/technology museums/centers and the non-science museums/sites reports only travelling within their home states for PD, with a few travelling regionally. All other audience segments report traveling regionally most frequently.
- 60%-90% of respondents across all institution segments indicate that they would be likely or very likely to train others on topics, techniques, or content learned in workshops and professional development sessions.

RESULTS – EPD RESOURCES VALUED

Most preferred resources (rated as “Important” or “Very important”) across all institutions:

- **Lesson plan/activity facilitation instruction**
 - Lessons that are already aligned to the NGSS were also indicated as the resource needed by most institutions.
- **Background information about session content**
- **Access to community of practice including attendees, facilitators, experts.**

RECOMMENDATIONS - PD

- NASA should respond to the demand for professional development for informal educators; PD is required for most respondents across institution types.
- NASA's unique position of combining science and engineering practices with cross cutting content and authentic scientific investigations should be utilized to fulfill STEM content needs expressed by informal educators through professional development.
- Provide In-Person PD when possible.
- NASA supports the literature-based philosophy that professional development must be sustained in order to have an impact. However, survey respondents preferred One-day PD (with the exception that Other Non-Profit prefer two-day PD).
 - On weekends
 - Not holidays
 - In Winter (or Fall)
 - Not Summer
- Providers of NASA PD should collaborate and offer synergistic courses that provide a wider context for educators and build on one another.

RECOMMENDATIONS - PD

- National conferences have a low representation of the overall profession. NASA PD may directly serve more front-line informal educators if it is offered at state and/or local meetings, rather than at national conferences.
- Informal educators are likely to very likely to train others (even though only a small percentage of survey respondents identified their primary roles as trainers). This should be considered as a method for maximizing reach (see more under “Future Studies”).
- Volunteers make up a portion of the informal education workforce. Trainings for some groups of informal educators, such as those who identify as “other/non-profit,” ought to include volunteers.
- PD should focus on instruction about how to facilitate activities and background information about session content. PARK, ONON, and CASC were highly interested in access to a content-matter expert after the session. Only NSMS had a high preference for instruction about how to implement evaluation.

RECOMMENDATIONS -PD

- Access to a community of practice for the session attendees, facilitators, and experts should be provided afterward. In light of the need for long-term professional development in order to make an impact, PD providers could consider partnering with other PD providers to maintain and support combined communities of practice.
- Among STMC, NSMS, and ONON, the need for outside sources of funding for PD was selected more frequently than other funding options, although some percentage of respondents from all segments indicated a need for outside funding, so this should be offered to all segments when possible. Focusing on STMC, NSMS and ONON as a priority. PARK, PUBL, CASC, and GOVT most frequently indicated that their organizations have funds for practitioners to attend PD sessions.

RECOMMENDATIONS

- NASA designers should use these recommendations and the survey results themselves as part of a Project Cycle Design Process. These results can be used as part of the Needs Assessment step followed by goal and objective setting, activity design, implementation, and outcome assessment.
- Many successful NASA informal education professional development programs have already been implemented. Before initiating a new project, designers should review project profiles on <http://smdepo.org> in order to review previous evaluation reports, avoid duplicative programs and maximize impact by collaborating with partners.

RECOMMENDATIONS - RESOURCES

- Resource providers must design resources for specific informal education audiences, as they vary widely.
- Science, technology, engineering, and mathematics (STEM) topics are covered at some frequency by many informal education institutions. Many institutions already address science and engineering. Resource developers can help informal education institutions go beyond what they already do by offering connections into technology and mathematics.
- Relative to other content areas, the nature of science is rarely covered (except at STMC and GOVT). NASA's high visibility in the public sphere provides an exciting window into the ongoing work of scientists. This position should be leveraged in future resource development to provide an additional avenue for informal educators to address this topic.

RECOMMENDATIONS - RESOURCES

- Informal education institutions frequently cover applications of science. Framing NASA resources in terms of this content area may encourage more informal education institutions to adopt them.
- Informal education institutions have barriers for implementing STEM programs. PD sessions should focus on easy-to-use materials and time-saving techniques to help institutions overcome the barriers of lack of funds, materials and resources, and staff to implement programs.

RECOMMENDATIONS - RESOURCES

NASA resource developers can maximize the usability and adoption of their resources by following these guidelines:

- NASA STEM content that is suitable for grades 3-5 can be disseminated to all informal education institution segments. With the exception of ONON and GOVT, grades K-2 are another population served by informal educators.
- NASA STEM content that is suitable for grades 6-8 will best overlap the audiences of ONON, GOVT, STMC, and CASC, which see this group among their top three largest audiences.
- NASA STEM content that is suitable for grades 9-12 will best overlap the audiences of ONON and GOVT, which see this group as their third largest audience.
- NASA scientific data and images can be incorporated into resources for use by STMC, ONON, and GOVT.
- Pre-produced text/images that an institution can print and display are especially valued by NSMS, PARK, PUBL, and GOVT.
- Downloadable posters/colorful handouts were selected among the top three informal education resource needs by only two segments (NSMS and CASC), indicating that these materials are not as effective an investment for NASA as lesson plans and other types of resources.

RECOMMENDATIONS - RESOURCES

- New and existing resources should be aligned to state standards, when practical, since there is alignment in all segments. Attention should be paid to the Common Core standards, since there is alignment in all segments except PARK.
- Only four segments have significant alignment to NGSS
- Existing NASA materials should be disseminated broadly, with an emphasis on the following types of resources:
 - Lesson plans for informal education activities with embedded assessment tools are of interest to all segments. Background information about PD session content is also important to very important across almost all segments.
 - Pre-assembled kits of lesson plans with all materials included would be especially valued by PARK, PUBL, CASC, and ONON.
- Existing and new lesson plans for informal education activities should include assessment tools.
- NASA resource and PD designers should reference *Supporting the Implementation of NGSS through Research: Informal Science Education*

FUTURE STUDIES

Evaluation

- The greatest percentage of respondents are responsible for evaluation their own programs, resources, and/or materials. Over one quarter of respondents from public libraries and other non-profit organizations don't formally evaluate their programs. However, evaluation is occurring in public libraries and potentially could become an important practice in future years. Additional assessments regarding the evaluation needs and practices of informal education practitioners are needed.

Assessment Tools

- Survey respondents were not given the option to select lesson plans with or without assessment tools. Future studies should characterize the type of assessment tools that would be implemented by informal education practitioners.

Train the Trainer

- Future studies should consider analyzing the effectiveness of train-the-trainer type models in informal education settings. The train-the-trainer model may allow NASA PD providers to offer trainings to a select group of informal education practitioners, who in turn disseminate what they've learned at state and/or local meetings. Upon considering this research, NASA PD providers may find this to be a viable option for maximizing NASA funds.