

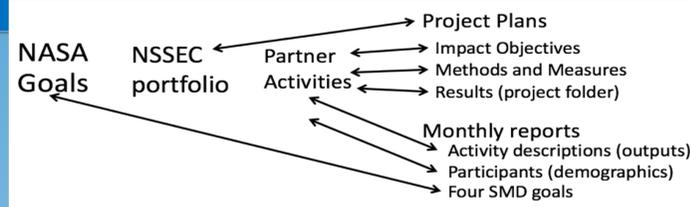
ED31D-1082 Measuring Effects Across NASA Space Science Education Consortium Activities Using NSF Impact Categories



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21 NSSEC Members

To track and report on the activities of the 21 members of the NSSEC, each project developed a project plan with impact objectives, methods and measures. Detailed results are also posted in the project folder. When activities are completed, a form is completed to report on demographics and outputs and relate them to the overall SMD goals.



Methods and Measures

What methods and measures can evaluators use to provide activity managers with evidence of effects that can be aggregated across activities? How rigorous can the different methods and measures be?

Less rigorous	More rigorous		
Post only survey or reflection; Follow up survey or interview; Web stats; Anecdotes; Facilitator reports	External evaluator observes, or does case studies; Pre/post self-report survey, reflections; Post only measures (test, retrospective survey, task)	Pre/post measures (performance tasks, tests, observation); Pre/post follow-up	Comparison group studies (quasi-experimental); Experimental studies (random assignment)

The summative evaluation included the National Science Foundation Framework (Friedman, 2008) impact categories of behavior, attitudes, skills, interest/engagement, and knowledge (BASIK).

- B** Behavior
- A** Attitude, aspirations, confidence
- S** Skills
- I** Interest, engagement
- K** Knowledge



Results

Results from evaluations of projects are reported in an online portfolio by institution and summarized across projects for annual reporting. For example, Afterschool Universe workshops developed methods and measures for each impact objective. Total NSSEC output data is shown in the pyramid.

Table of Specifications with Methods and Measures for Afterschool Universe

Impact Objective	Methods/Measures
Behavior: Use the activities with their audiences	1yr follow up survey on actual use
Attitude: Feel confident; Affect audiences' attitudes	During PD by educator reflection sheet Rate your confidence level for doing this activity, 1-10=highest 1yr follow up with educator On a scale of 1-10, how much did AU affect your participants' attitude. What evidence do you have?
Skills: Plan during; Audiences will develop skills	During PD Reflection sheet By session with "Tips and Tricks" and "Reminders" 1yr Follow up survey On a scale of 1-10, how much did AU affect your participants' skills? What evidence do you have?
Interest: Plan during PD; AU will interest audiences in space science	Post PD Survey What do you plan to do with this training once you have completed it? When do you plan to do the sessions? With whom? Where? 1yr follow up survey On a scale of 1-10, how did AU affect your participants; interest? What evidence do you have?
Knowledge: AU PD participants will increase their knowledge of key concepts in the program	Pre/post PD knowledge questions Gains in content knowledge for each lesson 1yr follow up survey On a scale of 1-10, how did AU affect your participants knowledge? What evidence do you have?

Monthly reporting form
 Email address _____ Person reporting _____
 Institutional or Organizational Affiliation (pulldown) _____
 Project or Activity (pulldown) _____
 Activity Description _____
 Zip code for activity location _____

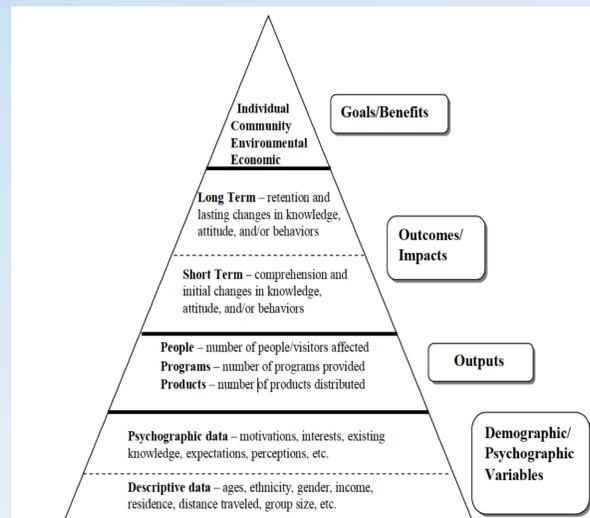
- Participants
- Youth (Elementary School age students, Middle, High, undergrads, grad students)
 - Educators - formal or informal (elementary, middle, high, inservice, preservice, higher ed, colleagues)
 - Public audiences
 - Disadvantaged or under-represented across all types of audiences noted above (socioeconomically, physically, minority female, Hispanic, African American, AI/AN/Pacific Islander, other)

- Results**
- Impact Objectives of this activity? Behavior, Attitude, Skills, Interest, Knowledge
 - NASA themes related to this activity? Earth Rise, Touch the Sun, Eclipses, Apollo 50th (check all that apply)
 - NASA SMD goals supported by this activity? (check all that apply) 1) Enable STEM Ed. 2) Improve Science Literacy, 3) Advance National EC

Other information you would like to share about: Personnel Changes, External Interactions, Presentations and Publications, Proposals

Timestamp	A	B	C	D	E	F	G	H	I
2/20/2018 10:34:34	Yamaska M Collado@vgn@nasa.gov	NASA Goddard Space Flight Center	ISWA	Yari Collado-Vega	February 2018				20850
2/27/2018 16:39:19	sboesch@iste.org	International Society for Technology in Education	International Society for Technology in Education	Sherry Bosch	February 2018	Blue - highlight		Online	
2/28/2018 10:18:15	e.a.macdonald@nasa.gov	NASA Goddard Space Flight Center	Aurorasaurus	Liz MacDonald	January 2018	Yellow - needs		20770	
2/28/2018 10:28:43	e.a.macdonald@nasa.gov	NASA Goddard Space Flight Center	Aurorasaurus	Liz MacDonald	January 2018	Green - everything		20770 + MU	
2/28/2018 11:25:01	e.a.macdonald@nasa.gov	NASA Goddard Space Flight Center	Aurorasaurus	Liz MacDonald	February 2018	Blue - highlight		20770	
2/28/2018 11:45:58	e.a.macdonald@nasa.gov	NASA Goddard Space Flight Center	Aurorasaurus	Liz MacDonald	February 2018	Green - everything		20770	
3/1/2018 14:44:25	raelmer@alaska.edu	University of Alaska Fairbanks (UAF)	UAF After School Programs	Rachel Elmer	January 2018	Green - everything		99775	
3/1/2018 14:46:15	raelmer@alaska.edu	University of Alaska Fairbanks (UAF)	UAF After School Programs	Rachel Elmer	January 2018	Green - everything		99775	
3/1/2018 14:47:19	raelmer@alaska.edu	University of Alaska Fairbanks (UAF)	UAF After School Programs	Rachel Elmer	January 2018	Green - everything		99775	
3/1/2018 14:50:46	raelmer@alaska.edu	University of Alaska Fairbanks (UAF)	UAF After School Programs	Rachel Elmer	January 2018	Green - everything		99775	

Online Portfolio Results



Hierarchy of Anticipated Outcomes (Adapted from Wells, M & Butler, B. 2004 in Friedman, 2008)

Example from Afterschool Universe PD

BASIK: Behavior

Objective: Participants will implement the Afterschool Universe program (or appropriate parts of it) with their audiences.

Measure: Pre-survey asked participants about what they intended to do with AU; post-survey asked for details - when? where?

Outcome: Participants laid out plans to implement 2018-19 and beyond

Follow-up with participants at end of summer 2019 will document the actual use of the program.

BASIK: Attitude toward self and program

Objective: Participants will feel confident to offer the Afterschool Universe program (or appropriate parts of it) to their audiences.

Measure: Reflection sheets during workshop asked participants to rate their confidence levels on a scale of 1-10 after each session.

Outcome: [Line graph showing confidence levels over time]

BASIK: Skills and Interest

Objective: Participants will intend to use the program or parts of it, identify key concepts, and record notes to help them with implementation.

Measure: Participants reflected on each activity by identifying key concepts, noting tips and tricks, and jotting down reminders.

Outcome: [Handwritten notes and diagrams]

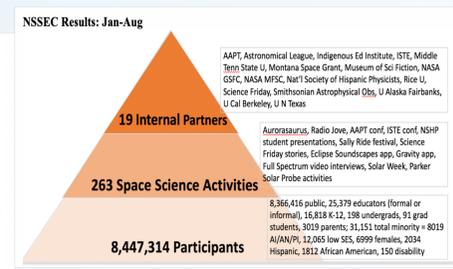
BASIK: Knowledge

Objective: Participants will be knowledgeable about the key concepts of each session.

Measure: Pre/post surveys included a 12 question knowledge quiz about key concepts in AU sessions.

Outcome: Pre/post gains were statistically significant on 9 of the 12 questions.

[Line graph showing knowledge gains]



- NASA theme-related activities: 139 Eclipses=139, 47 Earth rise, 29 Touch the Sun
- Status of funded activities: 93% Green (on schedule), 2% Yellow (needs assistance), 0% Red (immediate attention), 4% Blue (noteworthy)
- SMD goal-related activities: Enable STEM Ed=117, Improve science literacy=158, Advance national goals=154, Leverage partnerships=108

Monthly reports go into a google smartsheet so the community can review each other's reports and the management team can search and sort.

2019 Plans have identified BASIK impact categories for their objectives and will report outcomes by category in their monthly reports and post the supporting documents with data in their Project Folders in the community workspace.