FY23 NASA CONNECTS Evaluation Study: Report Brief

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NASA's **C**onnecting **O**ur **N**ASA **N**etwork of **E**ducators for **C**ollaborating **T**ogether in STEM – NASA CONNECTS – is an online community of practice (CoP) created in 2021. NASA CONNECTS facilitates educator access to NASA resources and supports educator collaboration and connection through discussion, networking, and the opportunity to share practices and resources. This evaluation study leveraged existing research and collected and analyzed data to understand the reach of and collaboration within the NASA CONNECTS community, relevance of content, efficiency of using the platform to find resources, and practices to support sustainability.

Purpose

The study provides evidence about how NASA CONNECTS supports teachers in creating compelling educational activities that support the NASA Office of STEM Engagement (OSTEM) Strategic Goal 3.0: Attract diverse groups of students to STEM through learning opportunities that spark interest and provide connections to NASA's mission and work (NASA Strategy for Science, Technology, Engineering, Mathematics (STEM) Engagement, 2023). The study offers information for NASA CONNECTS and Next Gen STEM (NGS) leadership to support planning and implementation decisions.

Methodology

The NASA CONNECTS evaluation study used a convergent parallel mixed-method design (Figure 1) to answer five evaluation questions (EQs). Quantitative and qualitative data were collected between February and June 2023. Data confirmed, cross-validated, and corroborated findings and results to answer different aspects of the evaluation questions.

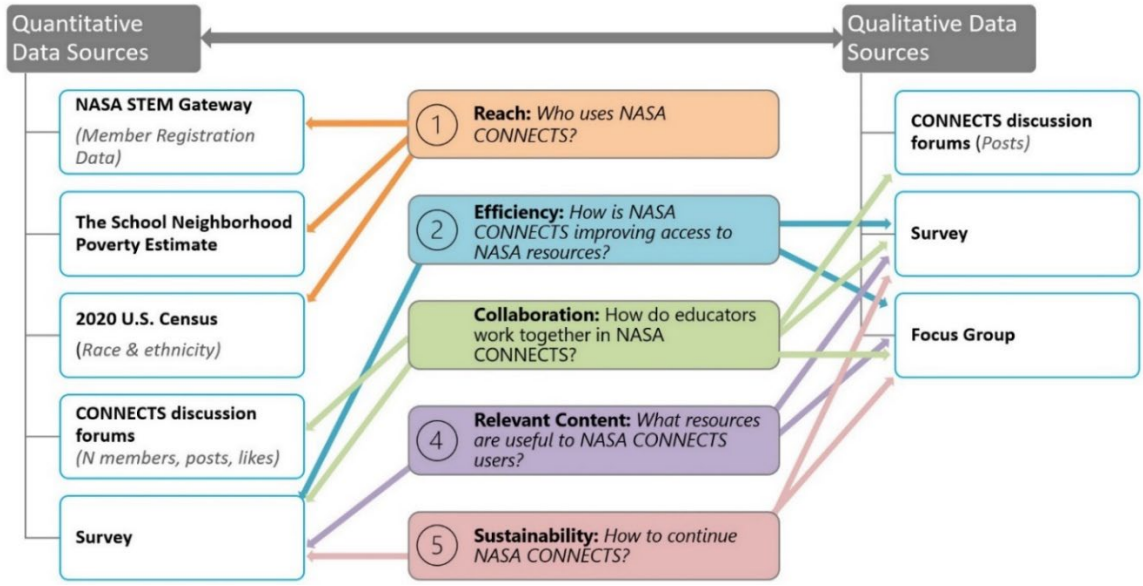

Figure 1 Data Sources and Evaluation Questions

Seventy-five NASA CONNECTS users responded to the evaluation survey and 18 participated in focus groups. NASA STEM Gateway registration data from 1,082 NASA CONNECTS users with verifiable addresses in the United States provided information about members' geographic location and background characteristics (e.g., educator type).

Findings and Recommendations

EQ1 Reach A little over one-half of NASA CONNECTS users, 56%, are K-12 formal educators. About one-third, 28%, are informal educators, including individuals who work in museums, national parks, planetariums, and libraries. The percentage of educator type varies by geographic region (Figure 2).

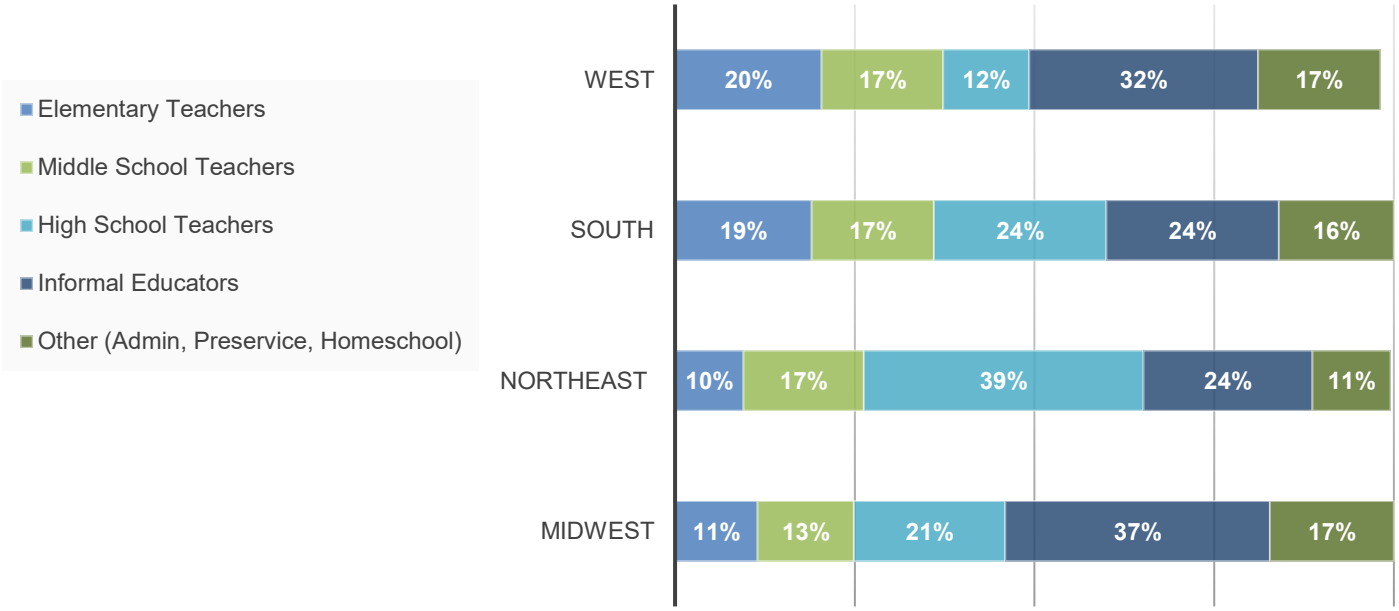

Figure 2 NASA CONNECTS Educator Type by Region

The proximity of NASA CONNECTS user's educational institutions was mapped to identify overlap with regions with high concentrations of student populations underserved and underrepresented in STEM. Figure 3 maps NASA CONNECTS users' institutional addresses over the predominant ethnicity and race by county. The location and type of NASA CONNECTS users' institutional addresses are shown by different colors and shapes of buildings, and the predominant ethnicity and race by county is indicated by various shades of color. The map also shows Income-to-Poverty (IPR) estimates, with the darker purple shades showing higher neighborhood poverty estimates.

NASA CONNECTS users are present in all 50 states, although the number of users in the west and extreme northwest is sparse (Figure 3). The full report identified geographic regions with high concentrations of students underserved or underrepresented in STEM with few or no educators engaged in NASA CONNECTS. These findings point to opportunities for targeted recruitment, including educators in geographically isolated or rural areas and those not near a NASA center.

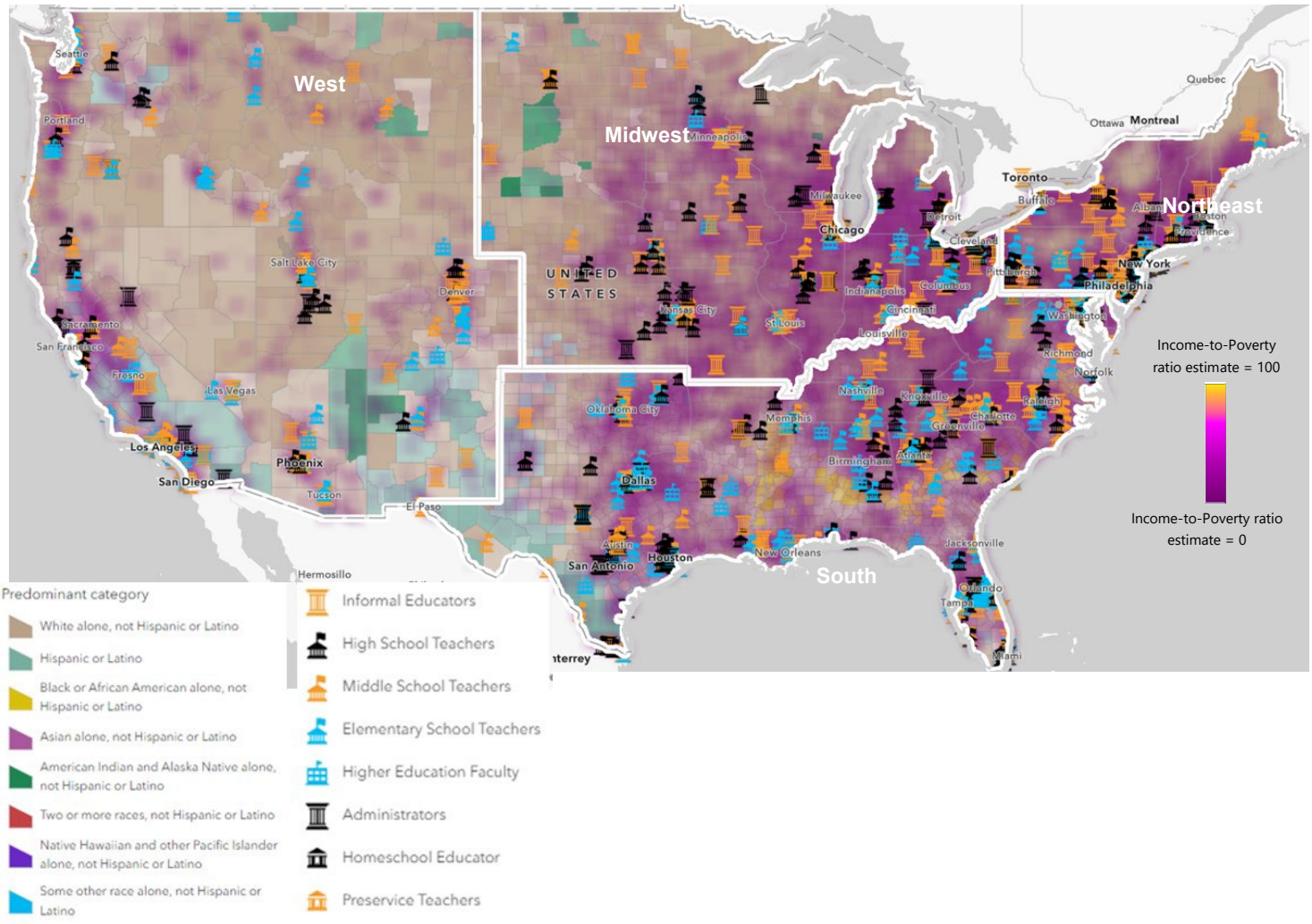

Figure 2 NASA CONNECTS users' institutional locations mapped with predominant county ethnicity and race and IPR estimates

Table 1 Summary of key takeaways and recommendations related to Evaluation Question 1

Reach: Who uses NASA CONNECTS?	
Key Takeaways: NASA CONNECTS users include formal and informal educators who reside across the U.S. There are opportunities to increase engagement of educators serving high-poverty population centers and predominantly Hispanic and Native American communities.	***Recommendations:*** • Increase use by formal and informal educators in NASA CONNECTS • Use targeted recruitment strategies to reach identified gap areas, including high-poverty, predominantly Native American, Hispanic, and Black population centers (see list in full report)

EQ2 Efficiency A majority (74%) of NASA CONNECTS members, those who log in daily or weekly as well as those who use the resource more infrequently, agree that "NASA CONNECTS has helped [them] find and access NASA educational resources more efficiently". Helpful features include notifications and updates, the banner that highlights information, the ability to save resources in collections, and the option to join affinity groups. Suggestions to improve efficiency included organizing resources more clearly by topic area and providing short descriptions of content to help users quickly determine if the resource is relevant before selecting. One educator described how small barriers in efficiency can be significant barriers for busy teachers.

> *Time is our most precious resource as a teacher. … Often, I forget my password…That's easy to fix… But again, there are these small little barriers, and it's like I have a stack of papers to grade. And [I mean to] come back to this, and sometimes I don't really come back. [Participant 9]*

Table 2 Summary of key takeaways and recommendations related to Evaluation Question 2

Efficiency: How is NASA CONNECTS improving access to NASA resources?	
Key Takeaways: Educators agree that NASA CONNECTS helps them find and access NASA educational resources more efficiently. Users offered suggestions for improving site efficiency and usability.	***Recommendations:*** • Work with NASA CONNECTS development team to ensure a high-quality user experience • Provide direct links to resources and live events • Improve search features to include multi-level filtering • Improve organization of resources (e.g., dropdown menus) • Include descriptions (e.g., grade-level, content, time)

EQ3 Collaboration Focus group participants reported that connecting and collaborating with other educators is valuable and energizing (see quote) and they are interested in increased opportunities to do so in NASA CONNECTS.

> *[F]or me it's very energizing to connect with other educators, share information. And I think a lot of educators are that way. [Participant 15]*

The 38% of NASA CONNECTS users who responded to the survey who use NASA CONNECTS for collaboration described posting and receiving messages and engaging in online events. NASA CONNECTS has the potential to facilitate stronger and deeper educator participation and connection as membership increases, features mature, and users become more engaged in the community.

Table 3 Summary of key takeaways and recommendations related to Evaluation Question 3

*Collaboration: How do educators connect and work together in NASA CONNECTS? (*EQ3)	
Key Takeaways: The most robust discussions, which educators value and desire, occur in interest groups and live events. Collaboration was identified as a potential area of growth for the NASA CONNECTS CoP.	***Recommendations:*** • Consider in-person opportunities, including professional development • Offer additional opportunities for discussions • Enhance opportunities for educators to share experiences and adaptation of resources and activities

EQ4 Content The greatest percentage of NASA CONNECTS users found the following resources useful: videos (88% agreement), professional development (73%), and lesson plans (67%; Table 4). Videos of 15 minutes or less in length, and especially those that are 2-5 minute long, were preferred.

Table 4 Percentage of NASA CONNECTS users who agree that resource type is useful

Resource	% agree
Videos	88%
Professional learning	73%
Lesson plans	67%
Engineering design challenges	61%
STEM career Resources	59%
Virtual student engagements	59%
NASA STEM games	57%
Internship information	44%
NASA Books for students	41%
Competitions	37%

Table 5 Summary of key takeaways and recommendations related to Evaluation Question 4

Content: What resources are useful to NASA CONNECTS users	
Key Takeaways: Educators find the materials they access on NASA CONNECTS to be high-quality and valuable. Among most useful are lesson plans, short videos, professional development opportunities, and connections to NASA research and mission-focused content.	***Recommendations:*** • Review lesser-used resources to determine whether educators are unaware of them or do not find them useful. Develop strategies based on needs • Offer resources that are: interactive, hands-on, organized around themes (e.g., Earth Day) and relevant and current issues (e.g., climate change), integrated across STEM, interdisciplinary, DEIA-focused • Emphasize materials that support awareness and exploration of diverse careers with diverse role models

EQ5 Sustainability In general, CoPs evolve and mature in about a decade. The two-year old NASA CONNECTS is a relatively new CoP in the beginning stages of development, with loose connections in the community (Table 6; Kezar & Gehrke, 2017). The majority of users (82% of survey respondents) are excited to keep using this resource due to the wealth of knowledge, live events, and opportunities to connect with educators. The appropriate focus of strengthening the CoP is on growing membership and supporting educators as they collaborate, build connections, and share knowledge in the community.

Table 6 Stages of Development and Key Tensions/Challenges for Developing CoPs

Stage	Tension/Challenge
Potential – Loose network of connections with potential for growth.	**Discover/Imagine** – Build on what is present or explore where potential could lead
Coalescing – Community coalesces as connections are built	**Incubate/Deliver Immediate Value** – Allow connections to form and trust to build; show community value
Maturing – Increasing membership and depth of knowledge	**Focus/Expand** – Direct energy or expand interests / focus
Stewardship – Active sharing and knowledge development	**Ownership/Openness** – Balance community ownership with introducing new ideas
Transformation – Evolving or energy waning	**Let Go/Live On** – Community wanes or transform to sustain

Source. From Kezar & Gehrke, 2017; Adapted from Wenger et al. (2002).

Table 7 Summary of key takeaways and recommendations related to Evaluation Question 5

Sustainability: How to continue NASA CONNECTS?	
Key Takeaways:	*Recommendations:*
This two-year old platform is evolving to meet user needs. NASA funding, professional staff managing the platform, and alignment with the NASA Learning Agenda are strengths. Users are excited to use the platform.	• Expand educator leadership and moderator opportunities to foster a new generation of leaders • Offer additional opportunities for members to connect • Highlight NASA Subject Matter Experts (SME) and moderators, who support excitement and community engagement

REFERENCES

Kezar, A., & Gehrke, S. (2017). Sustaining communities of practice focused on STEM reform. The Journal of Higher Education, 88 (3), 323-349.

Wenger, E., McDermott, R., & Snyder, W. (2002). Cultivating communities of practice: A guide to managing knowledge. Cambridge, MA: Harvard Business School Press.