

STEM in Libraries: National Survey Results

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Science-Technology Activities &
Resources For Libraries

Purpose

The purpose of the survey was to connect with librarians to determine:

- **What STEM programming is currently in place?**
- **How libraries approach and implement STEM programs?**
- **What challenges prevent libraries from incorporating more STEM programming?**
- **What kind of training and resources would be most helpful for librarians?**

Additionally, we sought the following information from STEM professionals, for the purpose of establishing and maintaining a Community of Practice:

- **What factors influence and enhance the success of Communities of Practice?**

Community of Practice (CoP)

A community of practice is:

- A group of people who share a concern or a passion for something they do, and learn how to do it better as they interact regularly.
- A professional learning community.



Methodology

- On-line survey and telephone interview for Library professionals, and an on-line survey for STEM professionals.
- Surveys administered through the University of Colorado's on-line survey system (Qualtrics).
- Surveys made available from late February through April 1, 2015 (approximately 5 weeks).
- Telephone interviews conducted during this same period, with respondents who provided their contact information on the surveys.

Library Professionals Distribution

- STAR-Net Community of Practice
- Afterschool Alliance
- American Library Association
- Association for Rural and Small Libraries
- Colorado State Library system
- Public Library Association
- Young Adult Services Library Association
- Explore! (through the Lunar and Planetary Institute)
- Chief Officers of State Library Agencies

STEM Professionals Distribution

- National Center for Interactive Learning newsletter
- Association of Academic Museums and Galleries
- Museum-L
- Museum-Ed
- Museum Junction (of the American Alliance of Museums)
- Colorado Science Educators Network
- Lunar and Planetary Institute
- Universities Space Research Association
- Association of Universities for Research in Astronomy
- Association of Science and Technology Centers and the Learning Lab community
- Mountain Plains Museum Association
- Afterschool Alliance
- Center for the Advancement of Informal Science Education (CAISE) newsletter, distributed to their listserv, and featured on their web site.

Results

- Library Professionals survey = **455 respondents.**
- STEM Professionals survey = **72 respondents**
- Open-ended interviews = **23 librarians** were contacted by phone regarding what kinds of STEM-related resources libraries need

Findings

- 1. Rural Libraries:** Need a concentrated effort to reach these communities, especially through online resources.
- 2. Library Programming:** Libraries' greatest needs are for "off-the-shelf" packaged programming that can be incorporated into their existing programming.
- 3. Training:** Need both on-line and in person to provide STEM knowledge and instill confidence.
- 4. Collaboration:** Communities of practice would be an effective tool for collaboration, support, and knowledge, but they require significant time and an effective network for communication.

Summary of Interview Results

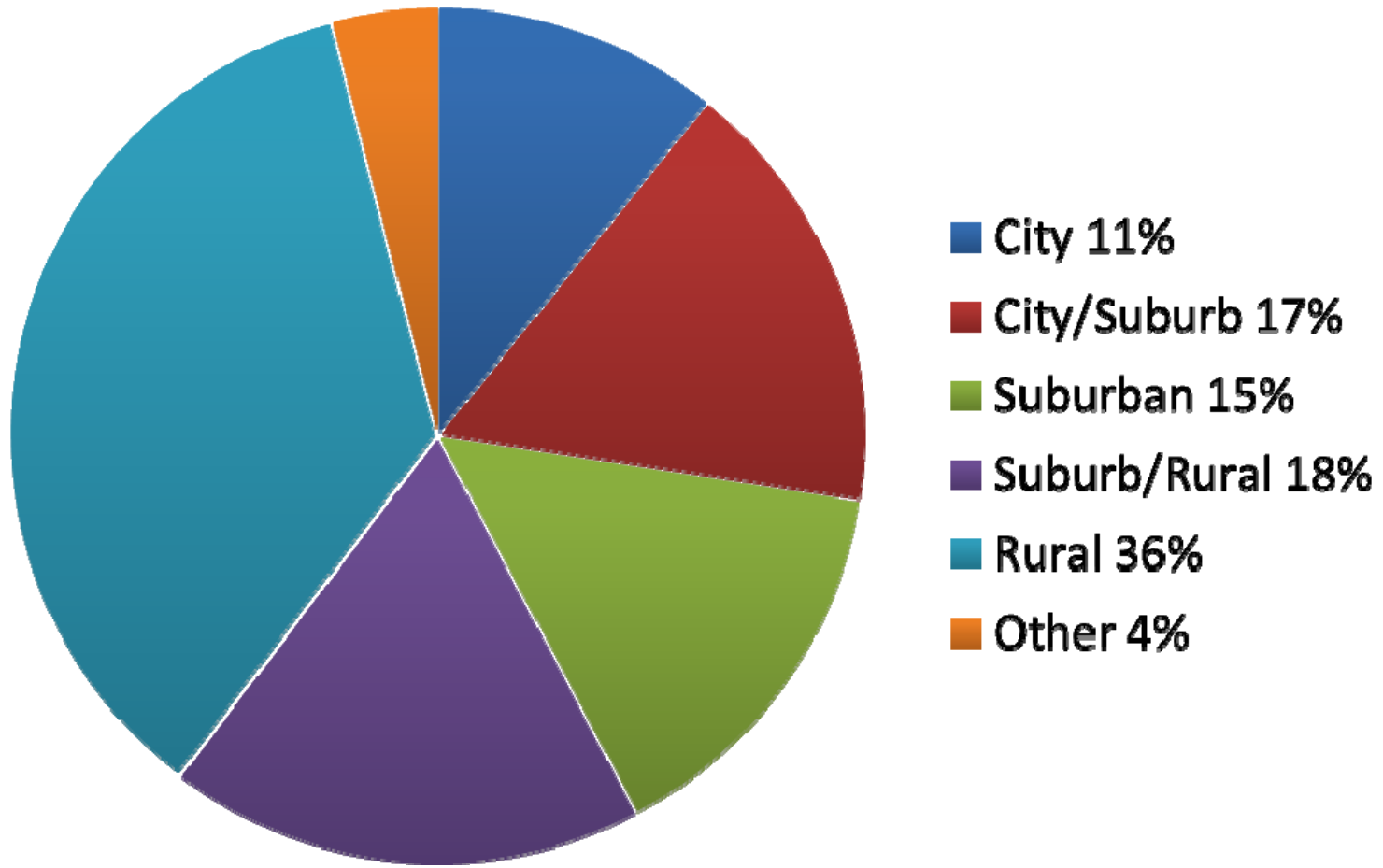
- **Libraries are focused on offering skills training.** They strive to teach something concrete and valuable.
- **Rural libraries often share resources** with other libraries.
- **Libraries integrate STEM into existing programming.**
- **Common constraints to STEM programming are:** limited time, staff, and resources; tech support for new technology; and a lack of confidence in teaching STEM material.

Summary of Interview Results (cont.)

- **The most common request is for pre-packaged STEM programming.** Programming is difficult to create for librarians with limited time, resources, and STEM knowledge.
- **Librarians requested training focused on STEM knowledge,** online and in person.
- Librarians expressed a **desire to form partnerships with schools, institutions, and even local businesses.**

Library Professionals Survey Results





Respondents



Type of Community: Rural

- Majority (58%) of respondents are from rural communities (which combines *remote rural*, *extremely rural*, and *mixed rural/suburb* districts).
- In both the survey and the interviews, respondents requested resources for rural areas that are online and are able to be shared between multiple libraries.

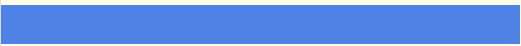




Library Programming

| How frequently do you offer STEM programming at your library? | | | | |
|---|---------------------------------------|---|----------|------|
| # | Answer | | Response | % |
| 1 | We tried it once | | 30 | 7% |
| 2 | Occasionally (2 or more times a year) |  | 138 | 30% |
| 3 | Monthly |  | 122 | 26% |
| 4 | Frequently (more than once per month) |  | 135 | 29% |
| 5 | Summer only |  | 36 | 8% |
| | Total | | 461 | 100% |

STEM programming is **offered somewhat frequently**; often **integrated into existing literacy and arts programming** such as hands-on investigations, art-based STEM projects, and STEM-related storytimes.

STEM Interest Areas

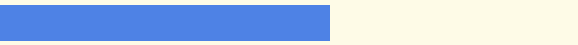

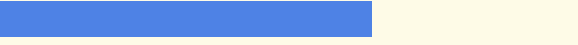






Which STEM areas would most interest your library? Please check all that apply.

| # | Answer | | Response | % |
|---|-------------|---|----------|-----|
| 1 | Science |  | 410 | 83% |
| 2 | Technology |  | 396 | 80% |
| 3 | Engineering |  | 403 | 82% |
| 4 | Math |  | 227 | 46% |
| 5 | None |  | 8 | 2% |

Science, Technology, and Engineering are popular interest areas; **Math not so much.**

Target Ages for STEM

What general age levels do you target with STEM programming? Please check all that apply.

| # | Answer | | Response | % |
|---|------------------------|--|----------|-----|
| 1 | Pre-K |  | 271 | 57% |
| 2 | Elementary students |  | 414 | 87% |
| 3 | Middle school students |  | 305 | 64% |
| 4 | High school students |  | 179 | 38% |
| 5 | Young adults |  | 100 | 21% |
| 6 | Adults |  | 108 | 23% |
| 7 | Seniors |  | 49 | 10% |
| 8 | Mixed ages (Families) |  | 171 | 36% |
| 9 | Other: |  | 15 | 3% |

Children aged **Pre-K through middle school** are the most common target audience.

STEM Program Staff

Who develops STEM programming at your library? Please check all that apply.

| # | Answer | Response | % |
|---|--------------------|----------|-----|
| 1 | Library staff | 448 | 96% |
| 2 | Outside partner(s) | 196 | 42% |
| 3 | Volunteer(s) | 67 | 14% |
| 4 | Other: | 19 | 4% |

Who conducts STEM programs at your library? Please check all that apply.

| # | Answer | Response | % |
|---|--------------------|----------|-----|
| 1 | Library staff | 437 | 93% |
| 2 | Outside partner(s) | 243 | 52% |
| 3 | Volunteer(s) | 101 | 22% |
| 4 | Other: | 18 | 4% |

- Programming is mostly **developed and conducted in-house, by library staff** though outside partners are also involved.
- Funding comes from the **library budget**, Friends of the Library, or foundation.

Professional Training for Staff

Which types of professional training/continuing education would you value the most? Please check all that apply.

| # | Answer | Response | % |
|---|---|----------|-----|
| 1 | State library association meetings | 212 | 47% |
| 2 | A national conference that brings together library and STEM professionals | 128 | 28% |
| 3 | Face-to-face training in your library | 321 | 71% |
| 4 | A Community of Practice | 198 | 44% |
| 5 | On-line webinars | 283 | 63% |
| 6 | Other: | 19 | 4% |

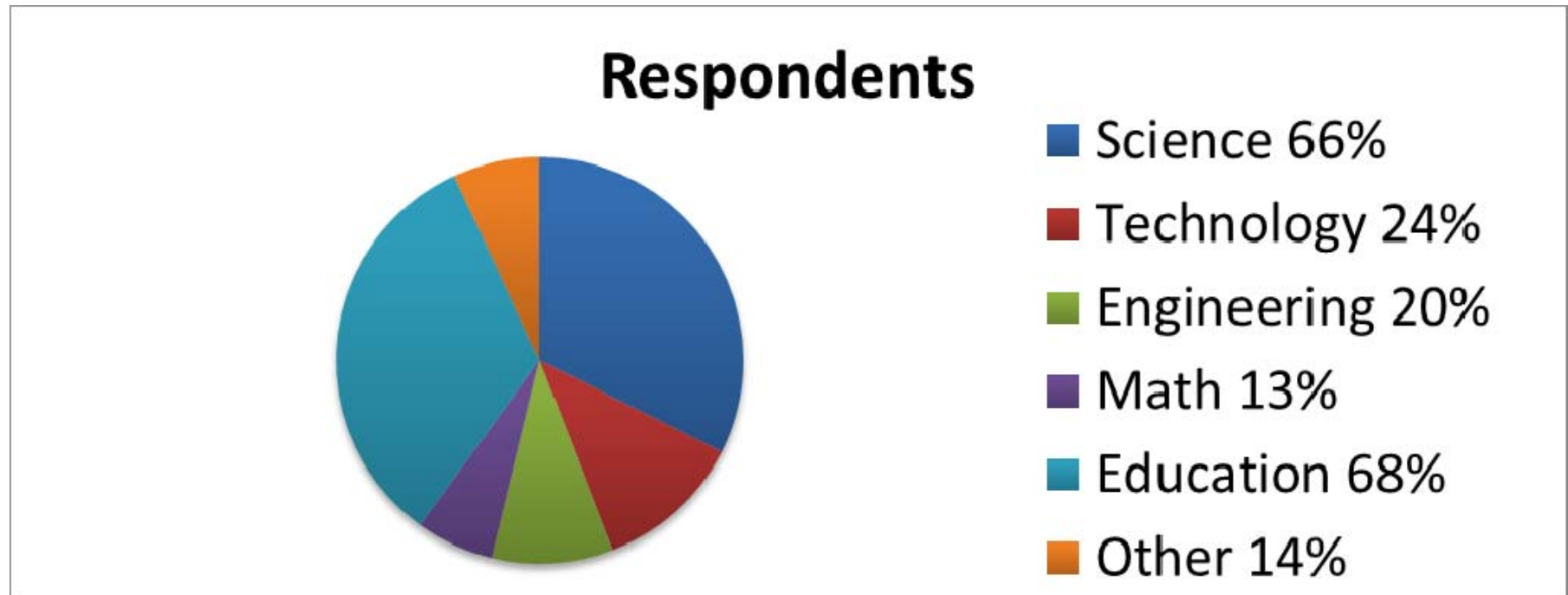
Face-to-face training in their library and **On-line webinars** were identified as valued most, followed by **State Library Association meetings** and **Communities of Practice**.

Communities of Practice

| Do you participate in a “Community of Practice?” | | | | |
|--|----------|--|----------|-----|
| # | Answer | | Response | % |
| 1 | Yes | | 116 | 26% |
| 2 | No | | 258 | 57% |
| 3 | Not sure | | 80 | 18% |

- Most Library professionals indicated **they did not belong to a community of practice** but of those that did, nearly half indicated they participated **both online and face-to-face**.
- A successful community of practice?: **Common goals, having a like-minded group to discuss issues with and plan programs with.**

STEM Professionals Survey Results



Education (68%) and Science (66%) were well represented in the STEM professional responses.

Communities of Practice

Do you feel your community of practice helps you to do your STEM job better?

| # | Answer | | Response | % |
|---|----------|--|----------|-----|
| 1 | Yes | | 37 | 77% |
| 2 | No | | 1 | 2% |
| 3 | Not sure | | 10 | 21% |

- Overall, respondents felt that **CoPs are beneficial.**
- By far, the greatest ranked obstacle to these communities was **Lack of Time.**

Communities of Practice (cont.)

| What factors do you feel make a successful community of practice? | | | | |
|---|---|--|----------|-----|
| # | Answer | | Response | % |
| 1 | Common goals | | 44 | 88% |
| 2 | Common approaches | | 10 | 20% |
| 3 | Having a like-minded group to discuss issues with | | 39 | 78% |
| 4 | Having a like-minded group to plan programs with | | 21 | 42% |
| 5 | Strong community of practice leadership | | 25 | 50% |
| 6 | Other: | | 15 | 30% |

Common Goals and a **Like-Minded Group to Discuss Issues with** are the biggest factors in a successful CoP, followed by **Strong Leadership**.

Communities of Practice for Both Library and STEM Professionals

- **Success for both groups?**
 - Common goals
 - Having a like-minded group to discuss issues with
- **Primary CoP?**
 - Both online and face-to-face
- **Primary communication sources** for finding out about their community of practice or STEM programming opportunities and resources?
 - Online via email, listservs, web searches, and word of mouth

Findings

- 1. Rural Libraries:** Need a concentrated effort to reach these communities, especially through online resources.
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Recommendations

- **Connect library professionals with STEM professionals and educators in communities of practice** – newly created or already in existence – for support, skills building, knowledge training, and programming that is engaging and relevant for various audiences.
- **Provide training, both in-person and online, for library professionals** oriented towards STEM knowledge and skills.

Recommendations (cont.)

- **Develop and distribute programming and how-to instructions** for library professionals that is available on-line and is able to be shared among libraries.
- **Provide concrete examples of activities, techniques, and games** that are shown to be effective at teaching STEM concepts, **especially math.**

STARnet

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