

# Teen Science Café Network

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## Year 3 Research Highlights

Final Report: 08/02/2023



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A man in a plaid shirt is standing at the front of a room, holding a small glowing light up. He is addressing a group of people, many of whom are wearing blue VR headsets. The room has brick walls and large windows. The scene is dimly lit, with the primary light source being the glowing light the man is holding. The audience is seated at tables, and some are looking towards the man. The overall atmosphere is that of a presentation or demonstration in a workshop or classroom setting.

# RESULTS

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## Status of the Network

# Historical Analysis: The Impact of COVID-19

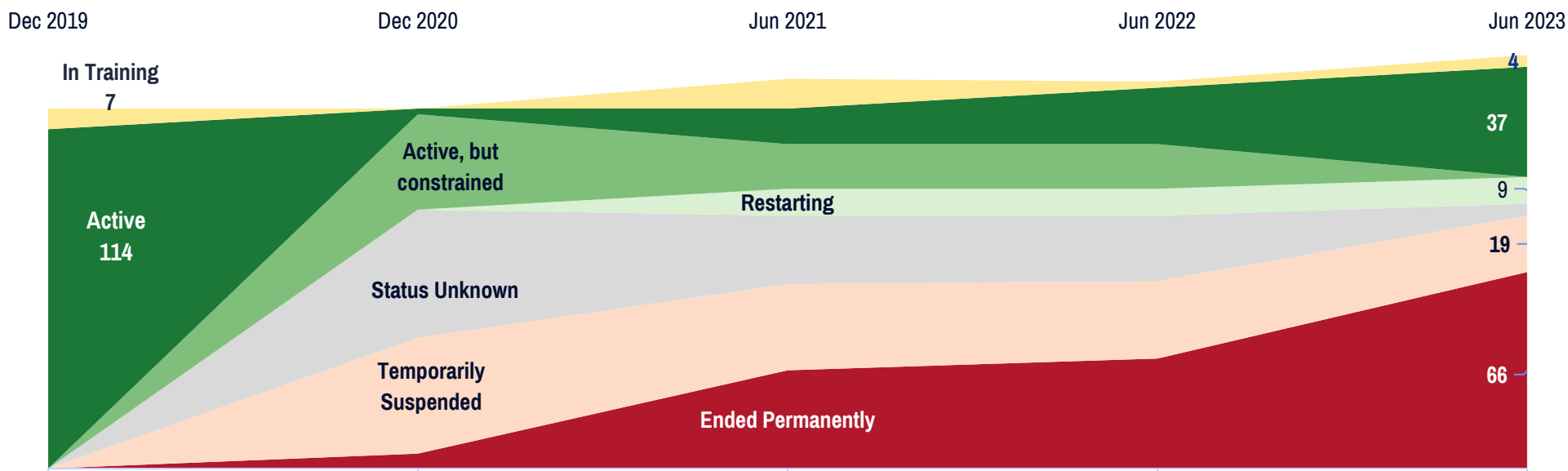
**The COVID-19 pandemic reduced the size of the TSCN network by about 60%—shrinking from 114 active sites at the end of 2019 to 46 sites active or restarting in 2023.**

The historic analysis shows waves of impact during and after the COVID-19 pandemic. By the end of 2020, almost no sites were running normally; although a small segment persisted to keep programs running in some fashion. In that time, the program lost contact with around one-third of members (“status unknown”). We suspect much of this was due to layoffs in 2020, although some could have included earlier program closures that were not systematically tracked by TSCN before the NSF research grant.

Another pattern is the aftermath, seen beginning in 2021. In 2020, very few sites *reported* that they were ending permanently, but by 2021, more institutions clearly stated they had no intention of restarting a program. Many of these sites were those who had previously been “status unknown;” with a renewed, systematic outreach effort for updates in June 2021, we were able to find more places that had ended. In 2023, analysis further transitioned any remaining “unknown” sites to “ended permanently,” documenting the final wave of pandemic-era closures. (With no response to repeated communications and efforts at outreach over 3 years, we felt this assumption was reasonable.) On the next page, we annotate this graph to highlight other key trends.

## Depicting the change in the status and size of the TSCN during and after COVID-19 (from 2019 through 2023).

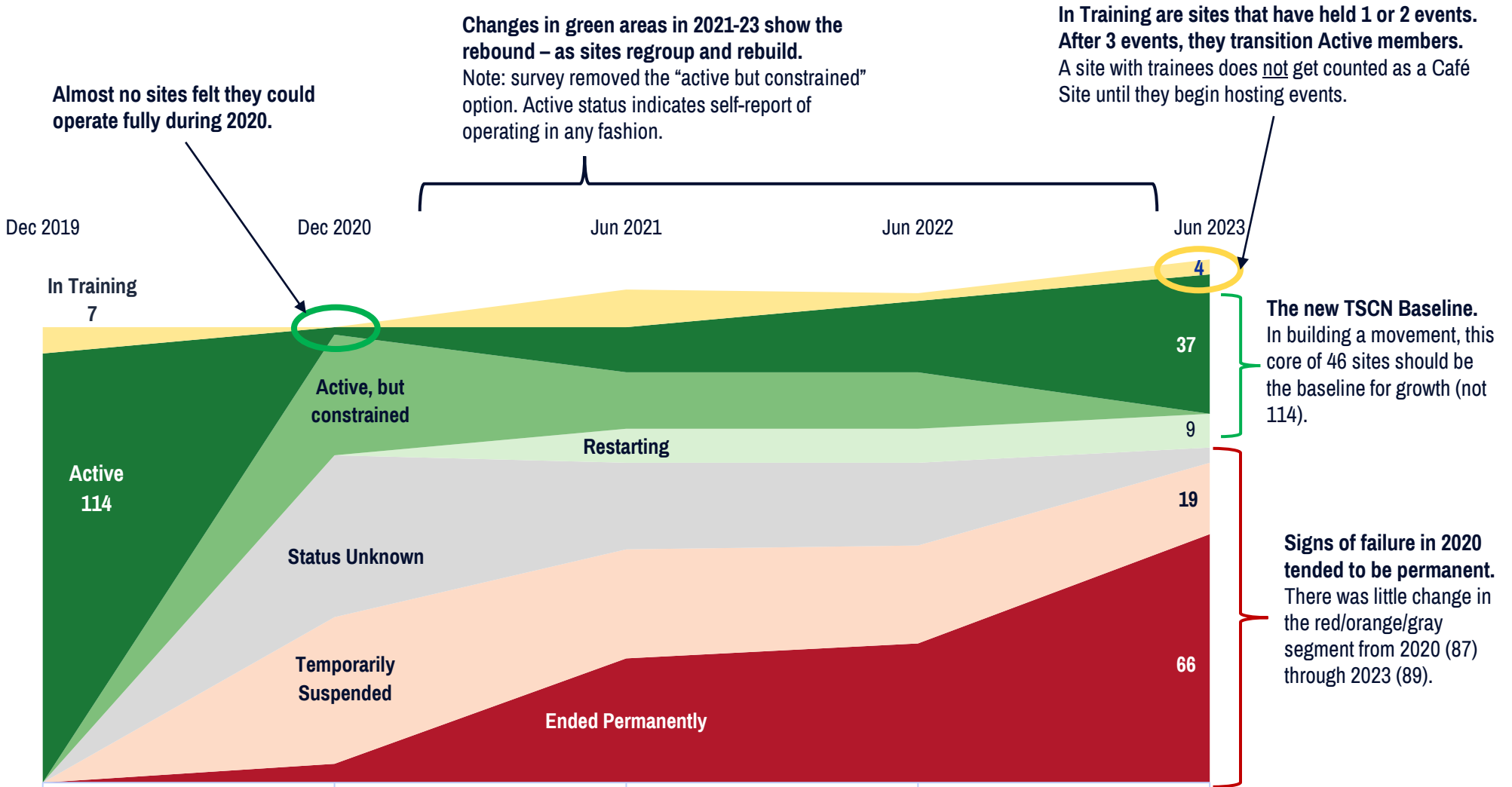
Colored areas depict the number of known TSCN sites at key check-in points before, during, and after the brunt of the pandemic. Changes in sizes of areas represent the corresponding increase or decrease of the number of sites that were at that status at the time of data records.



# Historical Analysis: Annotating the Visualization

Depicting the change in the status and size of the TSCN during and after COVID-19 (from 2019 through 2023).

Colored areas depict the number of known TSCN sites at key check-in points. Changes in area represent the increase or decrease of the number of sites at that status at that time.





# Annual Survey: Response Rate & Café Status

**In a positive development from previous years, three-quarters of responding TSC sites reported having active programs or were in the process of restarting.**

Primary contacts at each Teen Science Café site were asked to indicate their café’s status on the annual report in 2023. 24 sites responded that their site is active. In 2023, the option of “active but constrained” was eliminated from the survey, with all active sites indicating operations were as best possible. Another 7 sites responded they are in the process of restarting their café; they may not yet be running but are working to achieve that goal. The updated status of TSCN café sites continues the pattern of a rebound, with core sites striving to maintain the program.

About 25% of responding café sites indicated they are not currently active. 7 of those sites responded that their café is on pause, although they still have hope that at it may restart, while another 3 café sites permanently ended their programming.

As noted earlier, the program also determined that multi-year non-responders should be shifted to “ended” status, unless there is tangible evidence that a program is still operating at that location (e.g., the half who did not respond).

**Just over half of Teen Science Café sites responded to the annual survey (41 of 76).**

Annual survey requests were sent to 76 sites in the TSC database that were not listed as permanently ended. If a site had recently updated TSCN via email that they were temporarily suspended, they were not asked to submit an additional annual report (as responses would be redundant to data already reported).



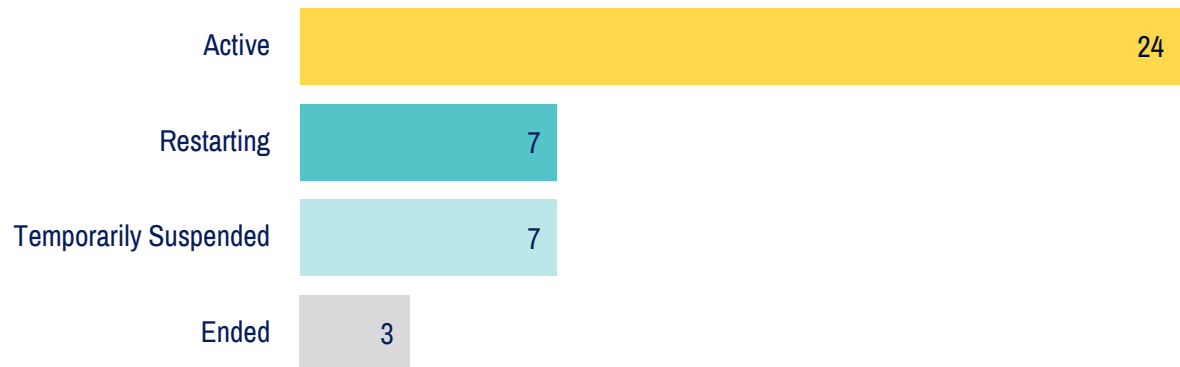
**74% of survey responses came from Adult Leaders at the café programs.**

Responses to the question “What is/was your role in the Teen Science Café program?” (n=41).



**31 sites have active TSC programs or are in the process of restarting.**

Analysis from survey question “How would you describe the status of your organization’s café program?” (n=41)



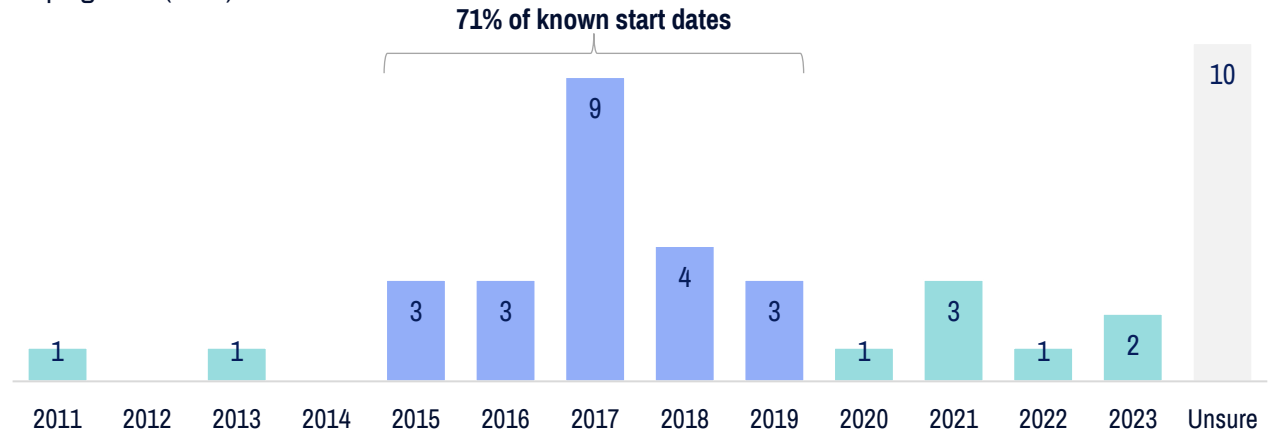
# Annual Survey: Café Profile

**Most responding TSC sites are supported by or based at museums / science centers or universities, and most active sites started during the prior Network-building NSF grant (2015-19).**

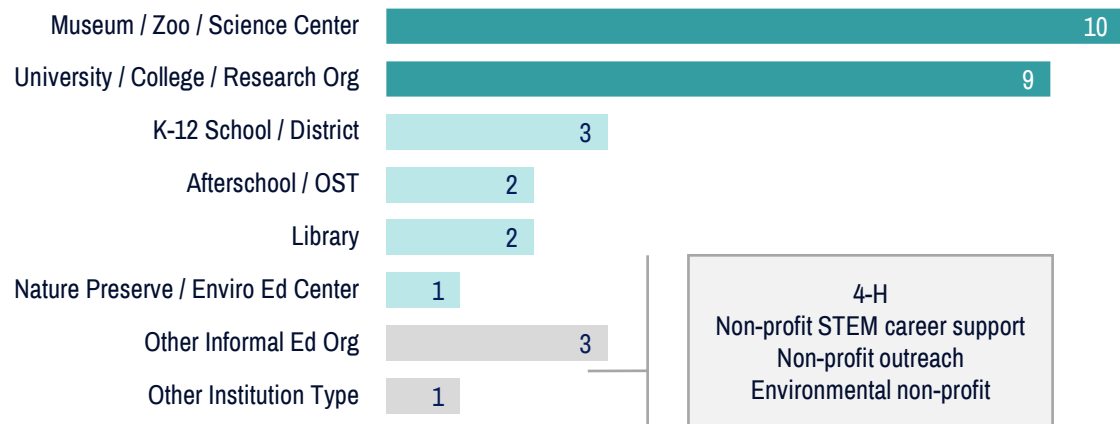
TSCN’s records of the network did not include the years that each café started, so this year’s survey sought to collect approximate dates from respondents. About one-quarter of respondents didn’t know, highlighting the staff changes that occur and loss of this type of historical knowledge. However, the known data from respondents indicated that most of the core sites now are from the growth of the network during the prior NSF grant, with the peak growth in 2017. About 7 sites reported establishing a program since 2020, with the start of the current growth and PD effort.

61% of sites indicated they were based at a museum/science center or university (n=19). Schools, afterschool organization, and libraries represented 22% of the total responses (n=7). One café was based at an environmental education center and four sites said their cafés were connected to nonprofit organizations that promote some type of STEM advancement.

**While 25% of respondents were unsure of when their café program began, 71% of sites who knew this information said their programs started between 2015 and 2018.**  
 Count of responses from the survey question “In what year (approximately) did your organization start its Teen Science Café program?” (n=41)



**Most respondents from Active or Restarting cafés were at museums or universities.**  
 Count of responses from the survey question “Which of the following best describes the institution that is responsible for your Café?” (n=31)



# Status of Café Events at Active Sites

**This year marked a return to in-person programming and more cafes per site. The majority of TSC sites held cafés in-person during 2022-23. Virtual cafés represented only 10% of total events held, in contrast with the past two years.**

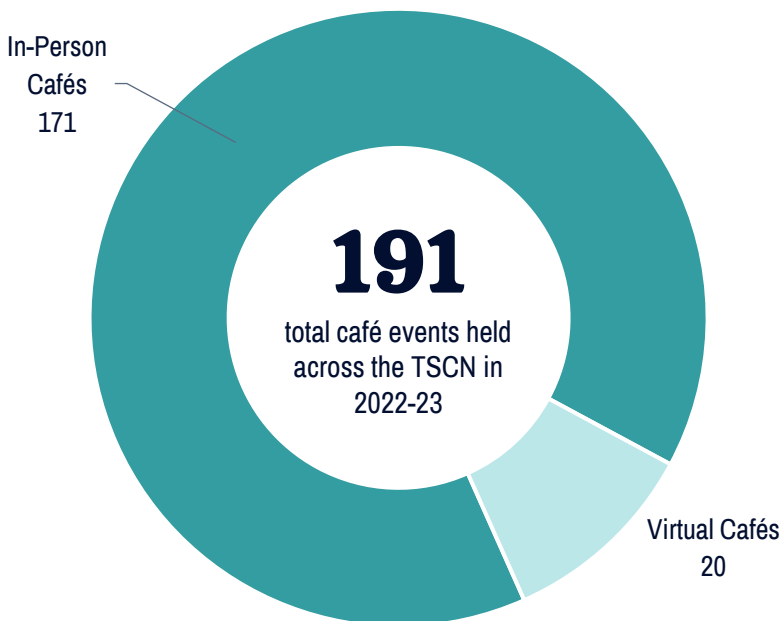
The number of café events and in-person cafés reported in 2022-23 were comparable to 2021-22 figures. However, with fewer café respondents this year, the median number of cafés held per site rose slightly to 6 events (from 4-5 events).

The total number of events reported by a single site ranged widely—one café site reported holding just one café event, while another reported holding 20 events this year. Within this wide range, **TSC sites typically held 6 in-person cafés or 2 virtual events.**

This year, in-person cafes resumed at 23 sites, with 19 sites holding exclusively in-person events. Virtual café events were held at some sites who found them to be effective, with 5 sites that reported hosting exclusively virtual cafés and an additional 4 sites that combined virtual with in-person events throughout the year.

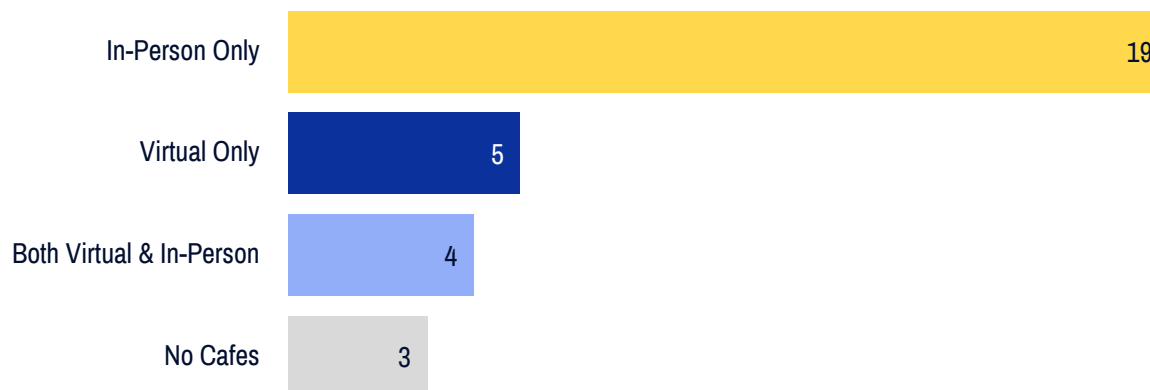
**191 Teen Science Café events were held in 2022-23 with 19 TSC sites holding all their events in person.**

Count of responses from the survey questions “What is the total number of events held at your site this past year?” and “Were you able to hold any café events between June 2022 and May 2023? Check all that apply.” (n=31)



**Median number of events held, per site, in 2022-23**

**2 virtual cafés**  
**6 in-person cafés**



# Teen Participation across the Network

The typical age-range of the teens participating in TSCN programs is between 13 and 18 years old, although fourteen sites are serving tweens (9-12).

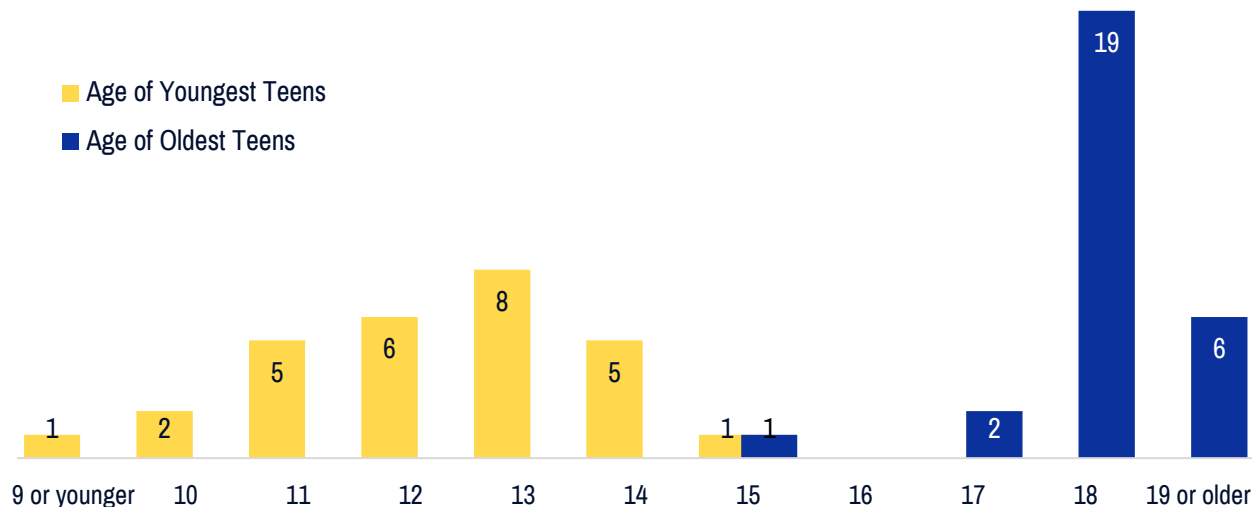
Half of active TSC sites reported serving tweens – those 12 or younger; one of these sites indicated their oldest participant was 15. This skew towards a younger audience is a notable variation, given the developmental stage of tweens (as young as 4<sup>th</sup> or 5<sup>th</sup> grade). On the opposite range, 6 sites indicated they served participants 19 or older with their TSC, likely college students (or adults).

This year, sites' estimates of their total teen attendance at all events ranged from 7 to 550 participants, with 8 sites reporting they hosted more than 250 teens in 2022-23. When asked about unique teens, estimates ranged from 5 to 400 individual teens. With this wide range, the median attendance was 124 teens per site, which represented 65 unique individuals.

Most sites track total attendance (22 of 28), so those numbers are reasonably accurate, although 6 sites are estimating. But only 10 sites track attendance by unique teens; those numbers should only be considered as estimates from the perception of the adult leader.

TSC sites indicated that the median age of their *youngest* participants was 13 years old, and the median age of their *oldest* participants was 18.

Count of responses to questions “What is the youngest age of teens served by your program?” (n=28) and “What is the oldest age of teens served by your program?” (n=28)



**4,561 teens**  
Total attendance across TSCN

**124**  
Median total attendance for a single site

**550**  
Maximum total attendance, reported by a single site

**2,410 teens**  
Estimated unique teens across TSCN

**65**  
Median of unique teens at a single site

**400**  
Maximum unique teens attending events, reported by a single site



# Audiences for TSC Members Target for Diversity

**About two-thirds of active TSC programs indicated that they specifically target teen groups that are historically under-represented in STEM for their programs. Targeting efforts sought to include more teens from a wide range of categories.**

Of those sites that reported targeting specific teen groups to diversify participation in STEM, nearly all (94%) reported that they aim to engage teens from lower socio-economic communities in their area.

The next most common target audiences for TSCs was cafés that were interested in targeting participation by girls (83%), Latino/a/x teens (78%), and/or Black/African American teens (72%).

Less common audience segments targeted by café programs to diversify STEM participation included rural, urban, and/or Indigenous teens in their communities. One site noted that they make efforts to target LGBTQ+ teens to be include in their café events.

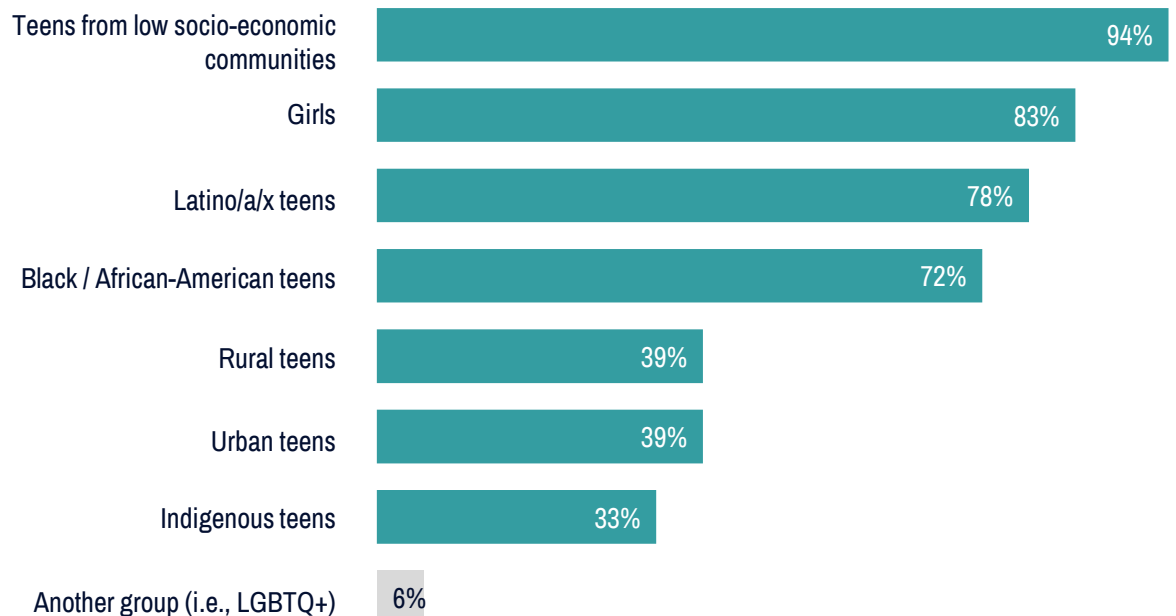
**64% of TSC sites indicated that they specifically target teen groups that are traditionally under-represented in STEM fields.**

Data analysis from survey question “Does your program specifically target teens from groups that are traditionally under-represented in STEM fields?” (n=28)



**Adult leaders report that teens from low socio-economic communities are the group they most frequently aim to engage, followed by girls.**

Count of responses to question “Which of the following groups of teens does your café endeavor to work with?” Respondents could indicate more than one group (n=18)



# 2022-23 TSCN Successes

**Over one-third of TSC sites reported that their teen leadership group was a source of pride and success. This was followed by improvement in this year’s attendance and teen engagement. Both of these show signs of improvement from 2022.**

Strength in teen leadership and engagement aligned with other notable successes such as having high-quality speakers, hosting cafés with popular topics, and building strong partnerships with community organizations that allowed sites to increase and diversify their audience.

Four sites described their café program positively impacting teens by instilling a sense of belonging and making them aware of opportunities for them beyond the program.

Café sites also noted successes in revamping their program structure and addressing issues of efficiency and sustainability. Four sites described improvements to their café model and two reported securing new staff and resources. Unlike the previous year where restarting a café program was the most noted success, this year, only three sites reported this factor as their ‘big win’.

**Teen leadership was the most frequent success reported by Adult Leaders this year.**

Coded analysis from survey responses to the question “Describe one big success your Teen Science Café program had this year.” An individual response could fall under multiple categories. (n=28)

(n=28)	Area of Success	Examples (in their words)
10	Teen Leadership	“Teen leaders trained and worked on youth quality program practices to create a more welcoming and inclusive environment for their peers.”
8	Improved Attendance & Engagement	“Our numbers! We have had an average of 21 students/cafe this year. Last year, the average was 15 students/café.”
7	Great Speakers / Topics	“We flew in 9 scientists who all are Antarctic researchers to present about their work. This is also huge, because we highlighted women's voices in STEM.”
6	Strong Partnerships	“This school year we partnered with the Parks and Recreation teen after school program to bring more teens to the program on a monthly basis.”
4	Positive Teen Impact	“...participants left the Teen Science Cafe with a sense of available medical careers and if they were suited for them.”
4	Improved Café Model	“Our bi-annual structure is one that works very well for our museum. It is sustainable for staff and sustainable for teen leaders and attendees as well!”
3	(Re)Starting	“After pivoting to all virtual programming due to the COVID-19 pandemic, we successfully got all schools except for 1 back to in-person programming.”
3	Reaching New Audiences	“The other purpose in partnering is that it connects families to local resources for our at-risk underrepresented populations.”
2	Secured Resources / Staffing Up	“Transferring the program to a new staff member and maintaining in-person cafes all year.”

# 2022-23 TSCN Challenges

**The most common challenge faced by café programs this year was low attendance and participant engagement. Related to this were challenges with event logistics.**

Although the majority of TSC sites reported as being active or restarting, their rebound from the pandemic slump varied. Nine café programs are still struggling with getting teens to attend and engage in café events – often when that had not been a struggle in the years before the pandemic. Teen apathy was also reported as an issue by 5 sites that had difficulty recruiting teen leaders or establishing their teen advisory committees.

Logistical challenges were mentioned by 7 TSC sites and included issues like transportation, weather, school schedules, catering, and time. Two sites noted that their organizations added to the challenges of running a program. And two sites simply admitted it was tough restarting a program post-COVID.

TSC sites also struggled with finding or securing critical program elements such as quality STEM speakers, event locations, and resources (e.g., staff and funding).

**Low attendance and teen engagement were the most common response regarding challenges TSC sites were experiencing this year.**

Coded analysis for the responses to the question “Describe one challenge that your Teen Science Café struggled with this year.” Individual responses could be coded for multiple different themes. (n = 28)

(n=28)	Area of Challenge	Examples (in their words)
9	<b>Low Attendance / Engagement</b>	“Growing those numbers - we were steady, but still struggling to compete with all of the activities our teens participate in.”
7	<b>Program / Event Logistics Issues</b>	“We live in a rural area so there is a need for events to be hybrid so people can join from rural school districts. We struggle with making an event engaging when there are people joining online.”
5	<b>Low Teen Leadership / Commitment</b>	“Finding teens who are interested in becoming leaders.”
3	<b>Finding Quality STEM Speakers</b>	“Finding quality speakers for all events. Most of our speakers were great, but we had a few that were sub-par, partially due to last minute cancellations.”
2	<b>Restarting Post-COVID</b>	“The school year is still a bit rough- Covid is still an issue and we're getting past that now”
2	<b>Securing Event Location</b>	“Finding a space to host the event that wasn't too loud, but was also accessible to all students at Columbia High School.”
2	<b>Limited Resources (e.g. staff, funding)</b>	“Having one year of corporate sponsorship and thinking of how to sustainably fund the program.”
2	<b>Organizational Challenges</b>	“Although our teens were very motivated and worked hard, our marketing team at our larger org. didn't listen to their needs regarding marketing and seems that our website may have some limitations.”

# TSCN Challenges by Organization Types

The profile of elements of running a TSC that are more and less challenging vary somewhat based on organization type.

Afterschool / OST and Libraries found it more challenging to market their events to teens. Securing time for adult leaders and recruiting teen leaders was more difficult for museum-based organizations, while finding and coaching STEM professionals was more challenging among organizations that are not museums or university-based sites, which may have more ready access to those professionals in their networks or staff.

Survey participants rated how challenging various aspects of running a TSC program are at their organization-type. The rating scale ranged from 1 (Not challenging) to 4 (Very challenging). Distribution of their average responses are presented below by organization type (n=28). Overall average across sectors is presented as a comparison benchmark.

More Challenging	Ratings indicate that these org types found the activity <b>more challenging than average</b> .
Less Challenging	Ratings indicate that these org types found the activities <b>less challenging than average</b> .

Average Challenge Rating (across all sectors)		Museum / Zoo / Science Center (n=10)	University / College (n=8)	K-12 School / District (n=3)	Afterschool / OST (n=2)	Library (n=2)	Other Informal Ed Org (n=2)	Other Type of Org (n=1)
3.1	Marketing events to teens to get attendance	3.1	3.0	2.7	4.0	4.0	2.0	3.0
2.8	Adult leader(s) have sufficient time within their positions to run a TSC program	3.0	2.8	3.0	2.5	2.5	2.0	2.0
2.7	Handing over more responsibility to teen leaders	2.8	2.6	3.0	2.0	3.0	3.0	1.0
2.4	Recruiting a group of teen leaders	2.6	2.5	1.3	2.5	3.5	2.5	1.0
2.4	Securing or advocating for sufficient funding and staffing	2.3	1.9	2.0	4.0	2.5	2.5	4.0
2.2	Finding high-quality STEM professional presenters	1.7	2.1	2.7	3.0	3.5	1.5	3.0
2.1	Coaching STEM professionals to work with teens in the café setting	2.0	2.0	2.3	2.5	3.0	1.5	3.0
1.5	Identifying topics of interest to teens	1.4	1.4	1.3	2.0	3.0	1.0	2.0
1.4	Finding suitable venues to hold café	1.1	1.4	1.3	1.0	1.0	2.0	4.0

# Ongoing Challenges Post-COVID

**As already mentioned in their TSC challenges, engaging teens to be interested in and attend café programs remains the area that sites are finding is even more difficult to do since 2020 than it was pre-pandemic.**

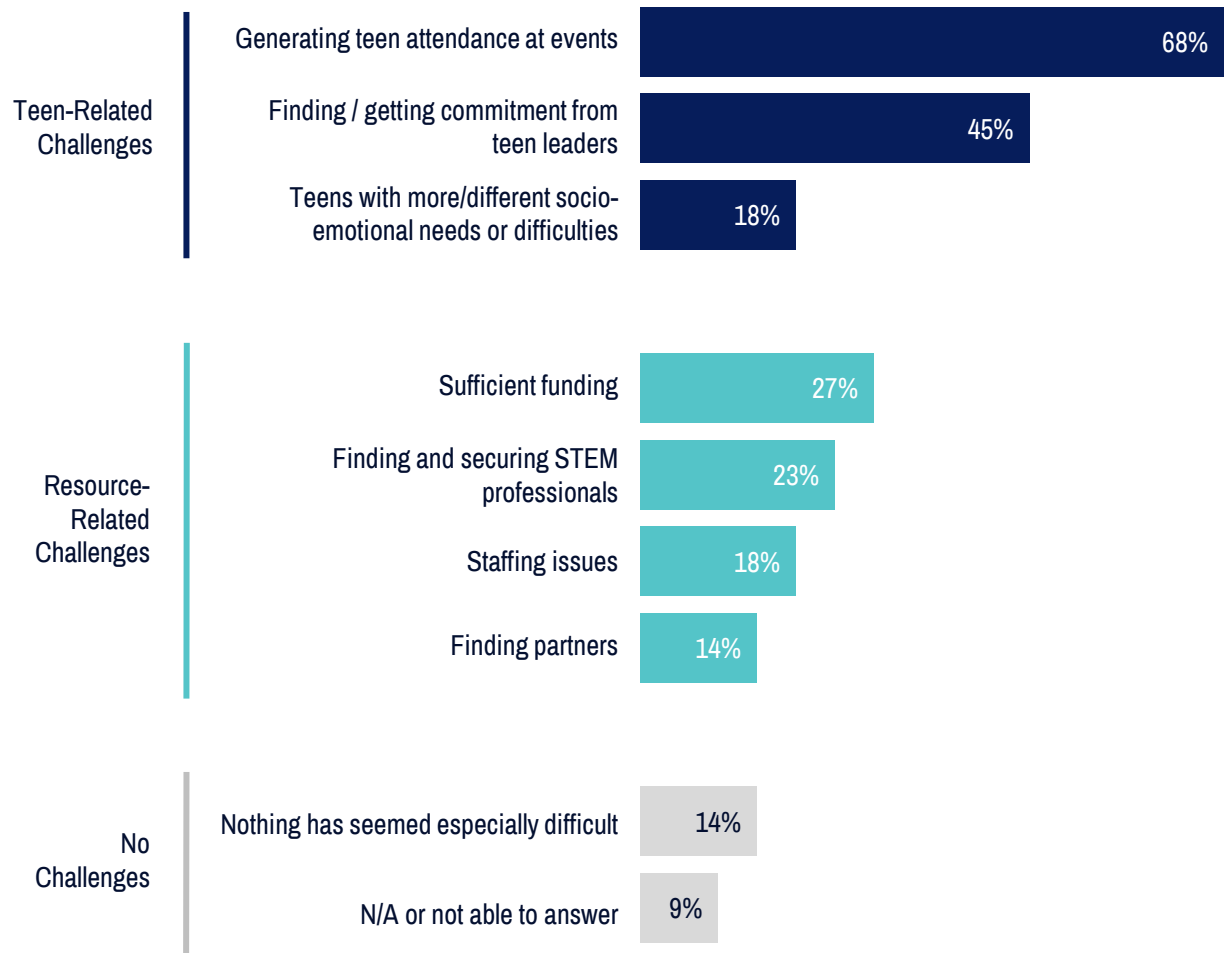
By far, getting teens to attend cafes is an unusually difficult task post-COVID, compared with earlier years. 68% of respondents indicated that they are still dealing with the pandemic slump in teen attendance. A further 45% said that recruiting teens and getting them to commit to being part of the leadership and advisory committee has been a challenge. Although anecdotes of greater social-emotional needs had been heard, only 18% of sites reported that this was something they felt they were struggling with more than pre-2020.

Other emergent difficulties since 2020 include issues related to staffing or funding, finding or scheduling STEM speakers, and connecting with community partners – although these tended to be unusually harder for only a quarter of fewer sites.

Notably, 14% of TSC sites said they did not experience more difficulty in the past few years than they had experienced pre-2020.

**TSC sites reported that since 2020, it has been more difficult to generate attendance at their events.**

Count of responses to question “In your experience, which aspects of running and managing a Teen Science Café program has felt especially difficult since 2020?” Respondents could select more than one issue (n=22).





# TSCN Contribution to Organizational Priorities

The TSCN contributes to organizations in three major ways – promoting STEM discovery, teen empowerment, and community relationships. These three values were each selected by over 90% of active café sites.

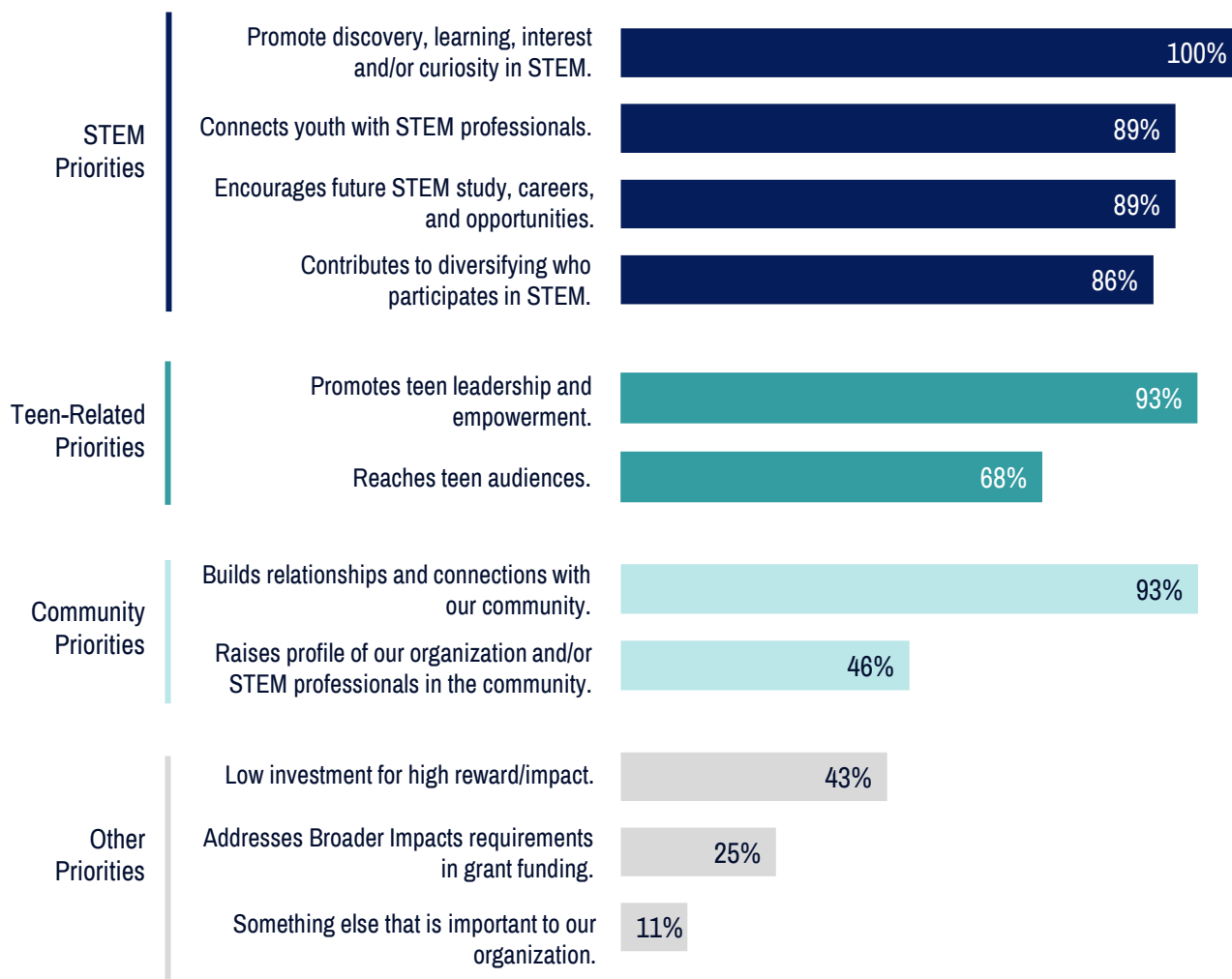
The group of statements that related to an organization’s STEM priorities were the most universal for TSC sites, with each of these items being selected by over 85% of active TSCN sites. The tie to organizational mission of promoting discovery in STEM was universal across sites.

In the area of teen priorities, 93% of organizations related to the program’s value in promoting teen leadership, and in community priorities, 93% felt it helped them build community connections.

Interestingly, relatively few adult leaders connected to the more instrumental values – organization-centered benefits of expanding reach to teen audiences, raising organizational profile in the community, and/or addressing broader impacts in grant funding. Adult leaders are centering on the mission-centered value of the Teen Science Café model to its organization primarily.

All respondents reported that their teen science café program contributes to their organization’s priority of promoting STEM curiosity and learning.

Count of responses to question “What benefits or value does a Teen Science Café program contribute to priorities that your organization care most about?” Respondents could select more than one option (n=28).



# How Sites Connect with the Network

**Over the past year, most TSC contacts read the monthly e-newsletters and social media to stay connected to the Network, showing indicators of success from the revamped and expanded efforts to regularly connect with members using these tools.**

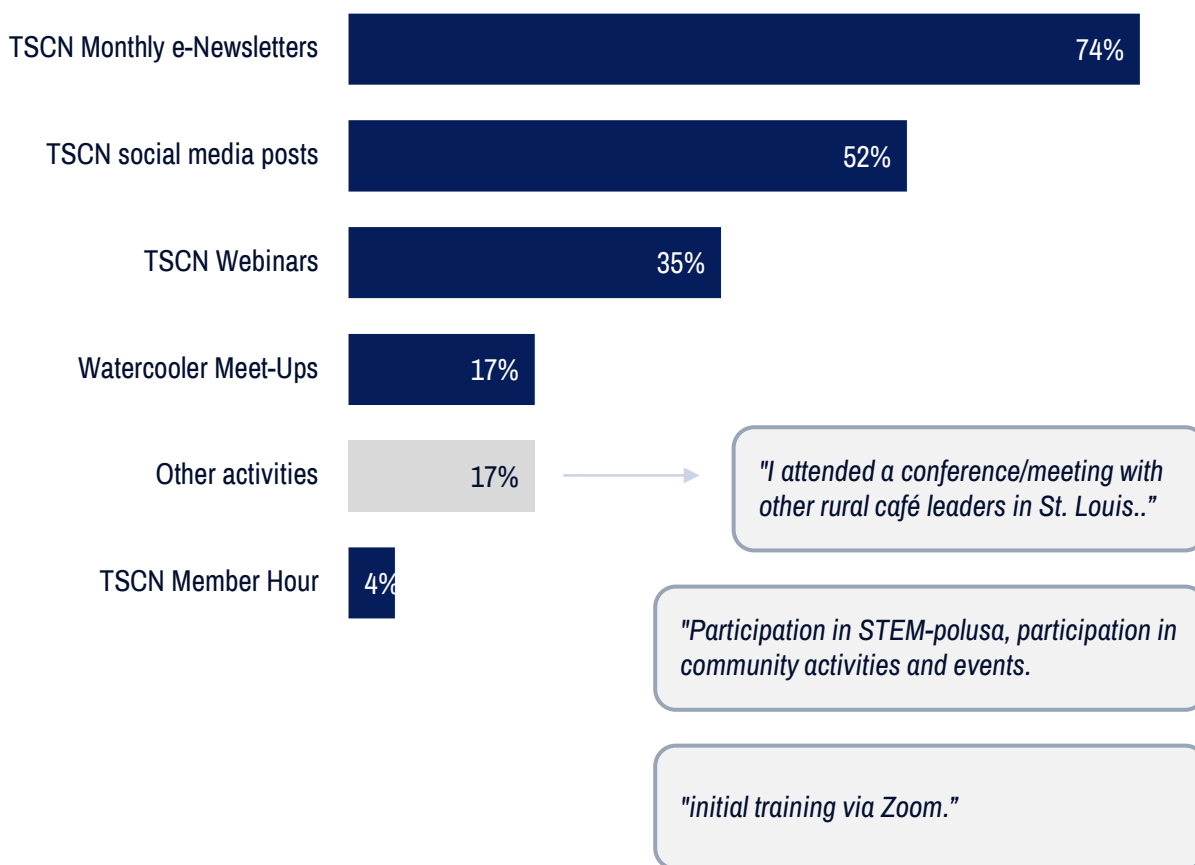
74% of TSC sites reported that digital newsletters (which have been sent monthly since Fall 2022) were the most common way to get Network news. 52% said they used social media, within which the Community Manager expanded footprint beginning in January 2023.

About one-third of sites said they participated in a TSCN webinar this past year. Four sites joined a watercooler meet-up and one site reported attending a TSCN Member Happy Hour.

Four sites indicated that they participated in other activities including a meeting of café leaders from the Rural TSC grant project (held in late summer 2022; not part of this grant), community STEM events, and TSCN training for members of the new cohort.

**Over half of TSC sites used e-newsletters and social media to keep up-to-date with the Network.**

Count of responses to question “Which of the following activities have you participated in or used during the past year?” Respondents could make more than one selection (n=23).



# Interest in Opportunities for Community-Building

**Although TSC sites responded favorably to a variety of ways to connect with the Network, the greatest interest was for an in-person TSCN conference, followed by interest in the searchable database of Café programs from the network.**

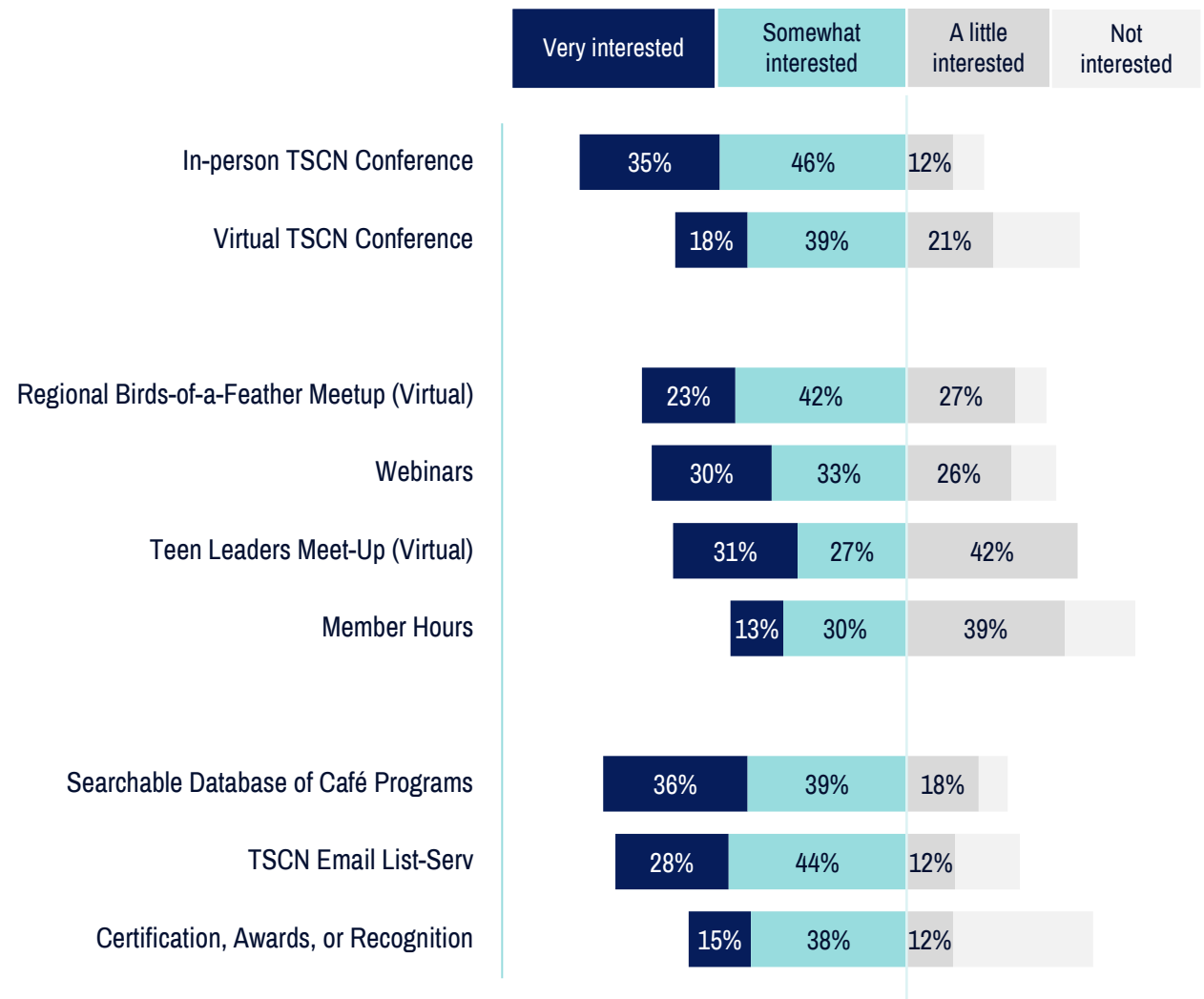
81% of TSC sites indicated being “somewhat” or “very interested” in attending an in-person TSCN conference. Interest in a virtual conference was substantially muted, in comparison; while about the same number were somewhat interested, far fewer were very interested in a virtual option.

Other virtual meeting opportunities were also viewed positively, but less enthusiastically than a conference, including regional birds-of-a-feather meetings (65%), webinars (63%) and meet-ups for teen leaders (58%). Member hours were not as popular, with only 43% indicating interest.

In addition to opportunities to connect and share ideas, TSC sites report quite interested in online resources such as a searchable database of café programs (75% very or somewhat interested) and an email list-serv (72%). They were less interested in professional development certifications, awards or recognition.

**TSC sites were most interested in participating in an in-person conference.**

Survey participants rated their interest in participating in to support their teen science café program. The rating scale ranged from 1 (Not interested) to 4 (Very interested). Distribution of responses are presented below (n=32).





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