



An assessment of CSCCE's short-form training course, *Scientific Community Engagement Fundamentals*

This report summarizes responses to CSCCE's assessment of the medium-term impact of its short-form training course, *Scientific Community Engagement Fundamentals (CEF)*

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Executive summary

This report summarizes responses to CSCCE's assessment of the medium-term impact of its short-form training course, *Scientific Community Engagement Fundamentals (CEF)*. It includes background and context for the assessment, methodology underpinning survey design, and results for each section of the survey. The survey addressed the following research questions which enabled us to determine impact at three levels of scale:

1. In what ways have CEF participants applied concepts, frameworks, and activities from the course in their community management work?
2. What impact has CEF had on participants as individuals, particularly on their confidence levels and career-related outcomes?
3. What impact has CEF had on participants' organizations and communities, particularly on member participation?
4. What impact has CEF had on their organizations' and communities' relationship to the broader STEM ecosystem?
5. What other resources, activities, or training have participants found useful in their community management work?

In brief, our findings indicate that:

- **95% of respondents have applied *multiple* CEF concepts, frameworks, and activities** in their roles to improve overall community strategy (68.6%), improve existing content and/or programming (67.4%), develop new content and/or programming (64%), and build alignment with team members (55.8%) - among other things.
- On an individual level, **the vast majority of respondents reported positive socioemotional outcomes** such as increased confidence (87%) and connection to peers (90%).
- On a community / organizational level, **74% of respondents reported at least one improvement in member participation within their communities, and 51% reported *multiple* improvements** – as described by deeper engagement across the modes of CSCCE's Community Participation Model. An even greater percentage (79.1%) selected multiple additional improvements beyond member engagement, such as the development of scaffolding and community engagement strategy.
- On an ecosystem-level, **38% of respondents reported *multiple* improvements in their organizations' and communities' relationship to the broader STEM ecosystem**, such as improved communication with external stakeholders or communities, greater clarity about their community's place within the broader STEM ecosystem, and new collaborations with external organizations or communities.

Our assessment suggests that CEF is achieving its function as our foundational training for STEM community managers – serving to advance our mission to professionalize and institutionalize the role of the community manager in STEM. It is having an impact at three levels – on individuals, on their organizations and/or communities, and additionally on practices across the STEM ecosystem.

About CSCCE

The Center for Scientific Collaboration and Community Engagement (CSCCE) champions the importance of human infrastructure for effective collaboration in STEM. We provide training and support for the people who make scientific collaborations succeed at scale and we also research the impact of these emerging roles.

Find out more about us on our website: cscce.org

Acknowledgements

The CEF course was designed by Lou Woodley and Camille Santistevan, building upon some of the curriculum Lou designed for the [Community Engagement Fellows Program](#) and adapted for an online setting. Over the years it has been taught by Lou, Camille, Alice Martinic, and Maya Sanghvi.

We are grateful to the Alfred P. Sloan Foundation for financially supporting the development of both CEF and the CEF course, and subsequent support to establish CSCCE.

The research in this report was funded by the Chan Zuckerberg Initiative (CZI), and we're grateful to Priscila Martinez at CZI for championing the wider application of this work.

Thank you to all our CEF learners and especially to everyone who took the time to complete the survey. Many of you were very generous with your time by completing the open-ended questions and providing specific examples.

CSCCE uses the CRediT contributor roles taxonomy to show how the authors listed contributed to the creation of this report:

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Citing and reusing this report

CITATION AND REUSE

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Introduction

Background and context for this assessment

Since the fall of 2020, the Center for Scientific Collaboration and Community Engagement (CSCCE) has hosted more than 15 cohorts of its flagship course, *Scientific Community Engagement Fundamentals (CEF)*. Two of these cohorts were funded by the Chan Zuckerberg Initiative (CZI) and open exclusively to its grantees, particularly those from the Essential Open Source Software for Science (EOSS) program, the Rare As One Project, and the Imaging program.

Prior to this assessment, CSCCE had conducted exit evaluations at the individual course level for all of its CEF cohorts to learn about immediate impacts on the learner at the time of graduation. In 2023, CZI commissioned an assessment of the medium-term to long-term impact that participation in the course has had on CEF participants and their respective communities. This is our first longitudinal course assessment and is intended to uncover more sustained impacts across multiple levels - the individual learner, the community / organization with which the learner is associated, and the STEM ecosystem more broadly.

WHAT IS CSCCE?

At the Center for Scientific Collaboration and Community Engagement (CSCCE) we champion the importance of human infrastructure for effective collaboration in science, technology, engineering, and math (STEM). We provide training and support for the people who make communities and collaborations thrive – whether their formal roles are community managers, researchers, program directors, administrative staff, or other conveners. We also research the impact of the emerging role of scientific community management, and use our findings to refine and contextualize our trainings.

Given CSCCE's role in establishing the importance of community management as a profession, this report is an important opportunity to determine whether our flagship training course, *Scientific Community Engagement Fundamentals*, is having a longer-term impact beyond the course duration.

THE CEF COURSE

[*Scientific Community Engagement Fundamentals \(CEF\)*](#) is an eight-week, online course designed to offer new and existing STEM community managers a core set of actionable skills and strategies as well as the shared language and frameworks to articulate the details of their work to others. Participants meet for 90 minutes twice a week, with lecture-style content interspersed with discussion, activities, and assignments. The course is generally a prerequisite for all other courses in CSCCE's catalog, which now includes [CSCCE's Community Manager Certification Program](#).

Establishing common ground through core frameworks and shared vocabulary

One of the approaches underpinning CEF is to provide community managers with core frameworks and vocabulary to describe their community's purpose, refine or create strategic programming to

engage community members around their shared goals, and identify ways to lower barriers to member participation. By creating this common ground, CEF supports scientific community managers of any level in conversing across disciplines (and with their colleagues), enabling them to more efficiently learn from one another and build successful engagement strategies that are grounded in theory.

Modeling community management in action

CEF is a “high-touch” course that is hosted by two facilitators and models many aspects of community management in its design and facilitation, including:

- Scaffolded onboarding (e.g., social hour, welcome documentation, how-to technical guides)
- Providing options for participants to exert their agency and that accommodate diverse motivations and barriers
- Intentional peer-to-peer matching (e.g., co-working groups, informal coffee chats)

Bridging theory and practice

CEF is also intentionally designed to bridge theory and practice by:

- Providing activities that enable participants to immediately apply concepts and frameworks to their work
- Modeling key community management practices that participants can repurpose in their own communities
- Encouraging peer support and connection via reflection activities, co-working, and show and tell so that participants have access to others with experiences relevant to their own

Topics covered during CEF

- **Week 0: Social hour** – An opportunity for participants to get to know each other via a scavenger-hunt activity.
- **Week 1: Defining community** – Learners describe their roles and the communities they work with, draft community overview statements, offer peer feedback on each other's statements in facilitator matched pairs, and discuss the importance of clearly defining their communities prior to developing engagement strategy.
- **Week 2: Community manager roles** – Using the [CSCCE Skills Wheel](#) as a core framework, learners discuss less visible leadership and how to hold different aspects of community manager roles in tension and completion.
- **Week 3: Persona development and member needs** – Learners identify, describe, and discuss member needs by creating personas for the different member types present in their communities. They also consider points of interaction between members that enable them to build towards shared goals together.
- **Week 4: Auditing existing content and programming** – Creating content and programming is a core part of community management work. This week, learners identify and describe their

current content and programming and assess how it supports members in meeting their needs.

- **Reading week: Feedback and co-working** – Two optional sessions where learners can get feedback on their course assignments and co-work with each other.
- **Week 5: Member engagement and the CSCCE Community Participation Model** – Discussions this week focus on [supportive scaffolding](#) – additional content and activities that enable members to engage within a community. Learners map their programming to the [CSCCE Community Participation Model](#) and discuss the role of [community champions](#) in supporting and evolving the community.
- **Week 6: Community lifecycles and graduation** – The course concludes with a discussion of three different lifecycle models that describe how communities can evolve. Learners relate these different models to community manager activities (and capacity) and member needs. During the final graduation session, learners present posters that synthesize all of the different course outputs, including community overview statements, member types, core programming, and how community activities map to the CSCCE Community Participation Model.

To graduate from CEF, participants must complete the final poster. All graduates are awarded a digital badge via Canvas Badges which can be shared online via social media platforms (including LinkedIn and X) and on their personal website. Graduates may also opt-in to be included on an [alumni page](#) on the CSCCE website.

CSCCE's approach to human-centered learning design

The CSCCE training team follows a five-step, iterative process when developing short-form trainings (summarized in Figure 1). The process begins with conducting **research**, including reviewing existing literature related to the training topic as well as investigating specific needs of CSCCE learners and their unique contexts. This research informs the **design** phase as we work to define initial learning outcomes - and outputs, assessments, and other activities that the training will include. In the **develop** stage, we draft lesson plans and course materials (e.g., presentations, activities, homework assignments) and check them against the learning outcomes outlined during the design stage. Next, we **implement** the training as a pilot and make real-time adjustments based on participant feedback whenever possible. Finally, we conduct immediate, post training surveys to gather additional feedback about the learners' experience and **evaluate** the success of the course. We often share a summary of these findings with participants after aggregating the results.



CSCCE's approach to human-centered learning design

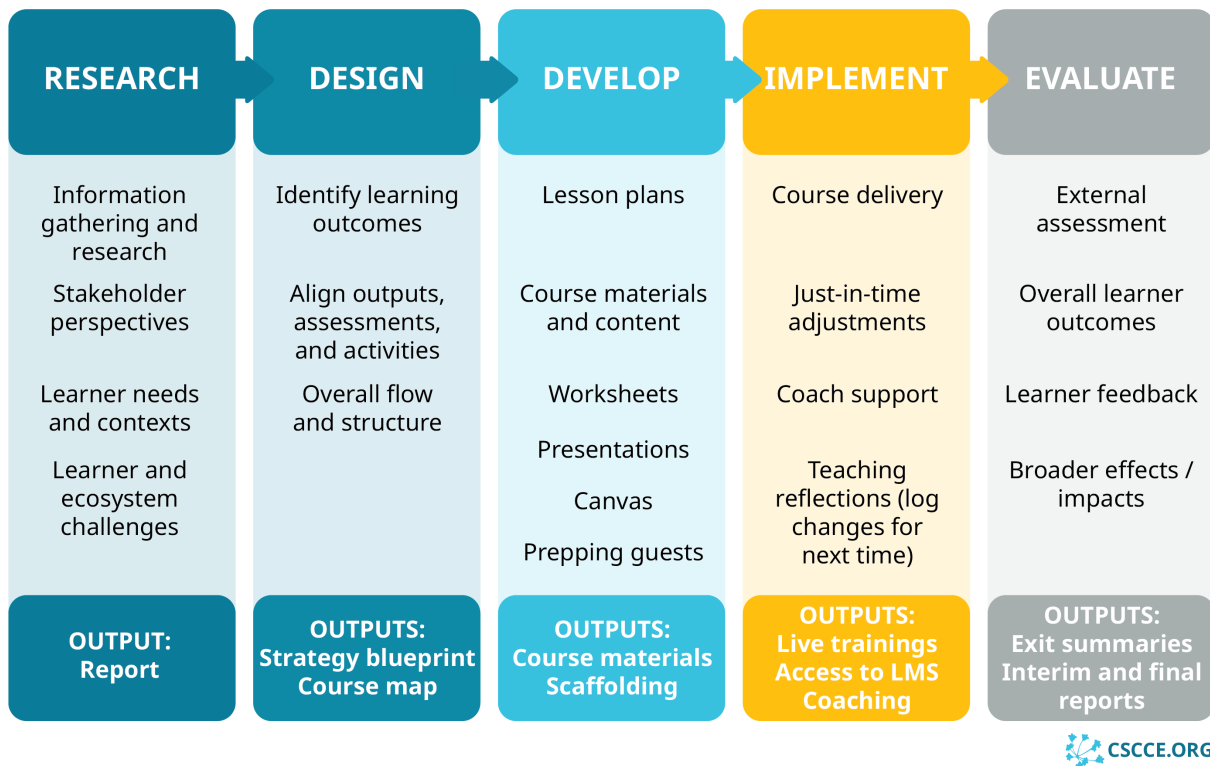


Figure 1

CSCCE's five stage approach to human-centered learning design is informed by Boller and Fletcher (2020). *Design Thinking for Training and Development*. ATD Press.

Assessment methodology

Our primary research goal was to determine whether participants have used or referenced CEF concepts, frameworks, and activities from the course in their work - and if so, how and what level of impact did it have? In course exit surveys, participants have reported positive socioemotional outcomes at the individual-level (e.g., increased confidence, connection to peers), so we were interested to see if these impacts have persisted, and explore any additional benefits. We were also interested in exploring evidence of community or organizational-level impacts since applying concepts from the course. And finally – a stretch goal of the course – we hoped that CEF would result in impact at the ecosystem level through community managers continuing to collaborate and evolve shared practices together.

Summarized, the main research questions that drove the design of the assessment were:

1. In what ways have CEF participants applied concepts, frameworks, and activities from the course in their community management work?

2. What impact has CEF had on participants as individuals, particularly on their confidence levels and career-related outcomes?
3. What impact has CEF had on participants' organizations and communities, particularly on member participation?
4. What impact has CEF had on their organizations' and communities' relationship to the broader STEM ecosystem?
5. What other resources, activities, or training have participants found useful in their community management work?

THE SURVEY INSTRUMENT

The survey was disseminated to all 285 CEF alumni via email and Slack between November 2023 and January 2024. We estimated that the survey, which consisted of the six sections listed below, would take between 15 to 20 minutes to complete. As an incentive, respondents received a code upon survey completion that they could use to optionally be entered into a raffle to win a free place in a future CSCCE workshop.

The survey was intended to be anonymous. Respondents were informed that only CSCCE staff would have access to the raw responses and CSCCE staff would aggregate and summarize the survey results into a report that would be shared on the CSCCE website, in a public repository such as Zenodo, and discussed during an online community call.

Question design

The survey questions were designed to learn more about application and impact. They consisted of a mix of Likert scale questions, multiple choice questions, and optional open-ended questions.

- **Likert scale questions** – intended to determine degree of agreement with specific outcome statements, e.g., “As a result of taking CEF...I felt more xxx”
- **Multiple choice questions** - intended to provide a range of outcome options to choose from

Both of these approaches are designed to reduce the cognitive load of recalling specific materials and activities (because those are listed in the prompts) and instead focus the respondent on noting whether an outcome occurred for them or the degree of agreement they feel with the statement.

- **Optional open-ended questions** - gave respondents the opportunity to provide specific examples and additional nuance to their closed-ended responses. These were included in all sections of the survey related to the higher-level research questions we were probing.

Survey sections

The survey had six sections, with sections 2 - 6 corresponding to research questions 1 - 5, respectively. Each section typically had 3 - 6 individual questions. See the Appendix for a complete list of survey questions.

1. **About you:** Basic demographic questions about the respondents such as their CEF cohort, community, and participation in other CSCCE activities.
2. **CEF activities, concepts, and frameworks:** Questions about how respondents have applied CEF activities, concepts, and frameworks within their community management work.
3. **Individual impact:** Questions about changes that respondents may have experienced *as an individual* after participating in CEF.
4. **Organizational-level impact:** Questions about changes that respondents' *communities or organizations* may have experienced after they participated in CEF.
5. **Ecosystem-level impact:** Questions about changes that respondents' communities or organizations may have experienced *in relation to the broader STEM ecosystem* after they participated in CEF.
6. **Other resources, activities, or trainings:** Questions about other resources, activities, or training that respondents have found useful in their community management work.

Results

Response rate and respondent demographics

I) RESPONDENT DEMOGRAPHICS

The survey began with a series of demographic questions including geographic location, details about the STEM communities that they manage, and details about their relationship with CSCCE beyond CEF.

A total of 86 respondents out of 285 CEF alumni responded to the survey (30%). The cohorts with the largest number of responses were CEF20F (9; 56% of the cohort), CEF21S (8, 42% of the cohort), CEF22F (9, 38% of the cohort), and CEF23F (9, 45% of the cohort). Of the private cohorts – CEF22CZI, CEF23AUS, and CEF23CZI – there were 3 (20% of the cohort), 5 (20.8% of the cohort), and 5 (25% of the cohort) responses, respectively.

The **vast majority of respondents were from the US, representing 59 (68.6%) of the responses.** Many responses were from Europe, totaling 15 (17.4%), and fewer were from Canada, Africa, and South America, which each had two responses (2.3%). We don't have complete geographical location data for all CEF alums so cannot compare this to the makeup of the total alumni population, but the high representation from the US broadly reflects the current composition of the CSCCE community overall.

II) TYPES OF COMMUNITIES AND THEIR DOMAINS OF FOCUS

There was a range of STEM communities represented in the responses (Table 1). Notably, **37 respondents (43%) selected multiple options, indicating that their community is a combination of different types.** Of the respondents, 35 (41%) manage a community of practice, 26 (30%) manage members of a research collaboration, 18 (21%) manage a community related to an open-source software project, and 16 (19%) manage a community of grantees. Fewer respondents managed members of a professional association (12, 14%), core facility users (7, 8%), and a community of fiscally sponsored projects (7, 8%) – 22 (26%) respondents selected “other.”

Response	Count	Percentage
A community of practice	35	40.7%
Members of a research collaboration	26	30.2%
Other	22	25.6%
A community related to an open-source software project	18	20.9%
A community of grantees	16	18.6%
Members of a professional association / scientific society	12	14.0%
A community of fiscally sponsored projects	7	8.1%
Core facility users	7	8.1%

Table 1
Responses to “What type of community do you manage?”

Thirty-seven respondents (43%) manage mostly online communities, while the next largest group is hybrid communities (26 respondents, 30.2%). Fourteen respondents (16.3%) manage exclusively online communities, while 8 (9.3%) have mostly in-person communities.

Regarding the domain or fields that respondents' STEM communities fall into, **58 respondents (67.4%) selected multiple** (Table 2). open research gained the most responses (23, 26.7%) and then data science (20, 23.3%) communities. The domains of biology, environmental science, interdisciplinary research, and open source each had 15 responses or more. The prevalence of these areas broadly reflects the composition of CSCCE's client projects. Combined, these observations suggest that these domains or fields are currently placing more emphasis on the role of community management, in whatever way that role is referred to in their context (e.g., stakeholder engagement, developer advocacy, research data management).

Response	Count	Percentage
Open research	23	26.7%
Data science	20	23.3%
Interdisciplinary research	18	20.9%
Biology	15	17.4%
Open source	15	17.4%
Environmental science	14	16.3%
STEM education	14	16.3%
Training / professional development	13	15.1%
Scholarly communications	10	11.6%
Computing	9	10.5%
Software development	9	10.5%
Engineering	8	9.3%
Neuroscience	8	9.3%
Diversity, equity, and inclusion	7	8.1%
Public health	7	8.1%
Genomics	6	7.0%
Medicine	6	7.0%
Physics	6	7.0%
Social sciences	6	7.0%
Chemistry	5	5.8%
Mathematics	5	5.8%
Artificial intelligence	4	4.7%

Table 2
Responses to "What is the primary domain or field of your community / organization?"

III) HOW PARTICIPANTS LEARNED ABOUT THE CEF COURSE

We also asked participants how they first found out about CEF and what other interactions they have had with CSCCE, beyond the course.

Twenty respondents selected more than one source of knowledge about CEF, indicating that individuals in the CSCCE ecosystem are aware of training opportunities through multiple channels. Of the respondents, **the majority (44, 51.2%) heard about CEF from a coworker/or colleague**, while 14 (16.3%) heard through a supervisor about CEF. Several respondents heard about CEF through CSCCE channels – the newsletter or Slack (9, 10.5%), a social media post (6, 7.0%), or a CSCCE staff member (5, 5.8%). Some learners heard about the course through various online sources, such as an internet search (8, 9.3%), a listserv (5, 5.8%), or Slack announcement (5, 5.8%). Other sources, including friends and CZI, were mentioned as well. As with any relatively new offering, it is unsurprising that word of mouth remains key for CSCCE's marketing.

IV) WHETHER COLLEAGUES HAD ALSO PARTICIPATED IN THE CEF COURSE

When asked whether others at the respondent's organization had taken CEF, **61 respondents indicated that one other member of their organization – either a colleague, team member, or supervisor – had taken CEF as well** and 45 respondents (52%) of the respondents indicated that multiple people at their organization may have taken the course. Thirty-eight respondents (44%) indicated that nobody else at their organization had taken CEF. Six people were not sure or the question was not applicable.

That several organizations have multiple representatives take the CEF course suggests a growing commitment to community management practices within individual STEM organizations, which may then experience greater positive impacts due to greater staff alignment. While we did not analyze the survey data at this level, we might revisit this in the future.

V) ONGOING RELATIONSHIP OF LEARNERS WITH CSCCE POST-COURSE

In terms of their lasting relationship with CSCCE, the **activities that respondents report doing most regularly are consuming CSCCE generated content, such as reading the weekly Slack roundup (51.1%), the monthly newsletter (57%), or resources published on Zenodo (30.2%)** (Figure 2). There is less engagement in activities that center on collaboration or co-creation such as the monthly community calls or posting on Slack. However, these data can also be compared with the findings about individual level impact of CEF, which indicate **60.5% of respondents interacted with their classmates through several routes within the CSCCE CoP and 23.3% had been approached by a community manager from outside their cohort**. This suggests that there's some ongoing connection between learners, including between learners across cohorts, even if this doesn't manifest in the wider CoP (which includes individuals who have not taken the CEF course).

Since completing CEF, how often have you engaged in the following activities within the CSCCE Community of Practice? (%)

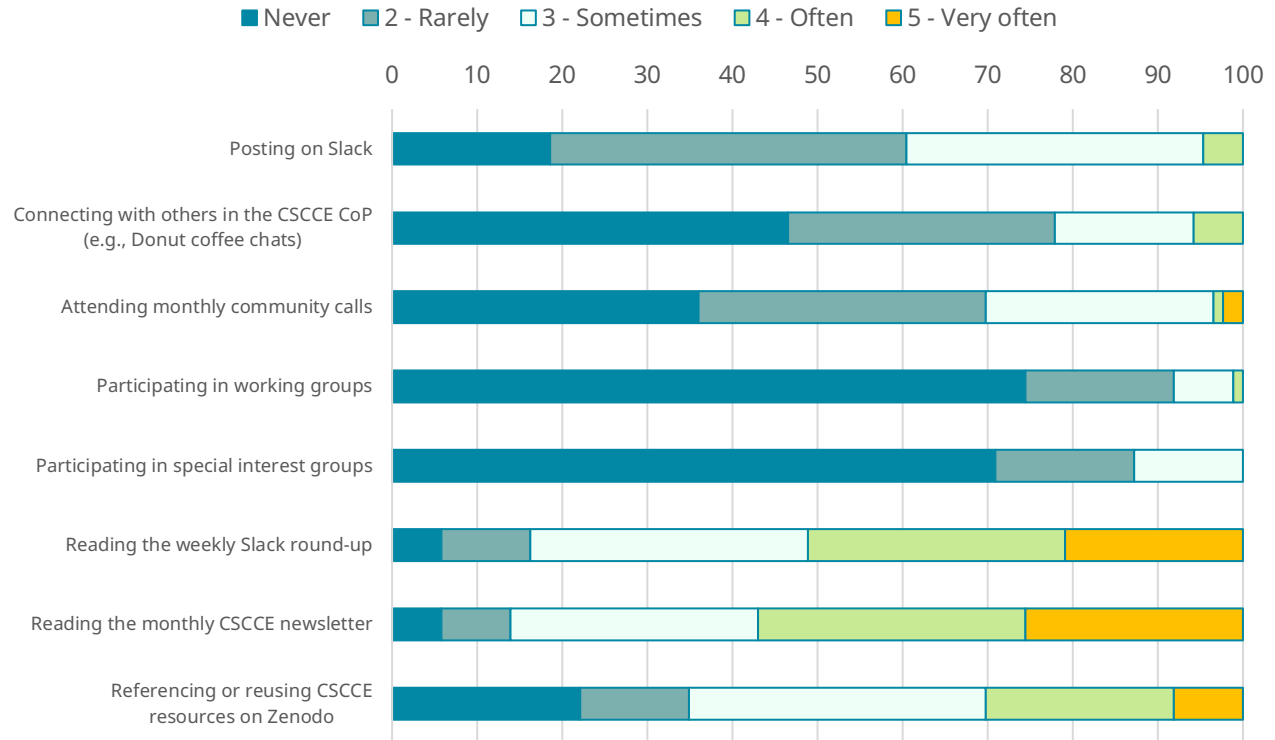


Figure 2

Responses to “Since completing CEF, how often have you engaged in the following activities within the CSCCE Community of Practice?”

In detail, learners engage with CSCCE’s activities in the following ways:

- **Posting on Slack:** A majority of the respondents (41.9%) have rarely posted on Slack, with 34.9% reporting they sometimes do. However, 19% have never posted, and a minimal 4.7% do so often.
- **Connecting with others in the CSCCE CoP (e.g., via Donut app-mediated coffee chats):** The most common response was 'Never', reported by 46.5% of the respondents. 31.4% mentioned they rarely connect, while 16.3% sometimes engage in such activities. 5.8% often connect with others.
- **Attending monthly community calls:** The responses were spread out, with 36% never attending these calls and 33.7% doing so rarely. About 26.7% sometimes attend, and a small minority (3.4%) often or very often participate in these calls.
- **Participating in working groups:** This activity saw the highest percentage of 'Never' responses at 74.4%. Participation here is limited because CSCCE establishes working groups on an *ad hoc* basis and there were no active groups at the time of the survey.
- **Participating in special interest groups:** Similar to working groups, a high number (70.9%) have never participated, while 16.3% rarely do. Only 12.8% sometimes engage with special interest groups.

- **Reading the weekly Slack round-up:** This activity has a more balanced distribution of responses. While 5.8% never read the round-up, 10.5% do so rarely and 32.6% sometimes. A substantial proportion, 51.1%, often or very often read the weekly Slack round-up.
- **Reading the monthly CSCCE newsletter:** Similar to the Slack round-up, the monthly newsletter has a wide readership with 57% often or very often reading it, 29.1% doing so sometimes, and only 13.9% rarely or never engaging with it.
- **Referencing or reusing CSCCE resources on Zenodo:** The responses are evenly spread across the frequency spectrum. While 22.1% never use these resources, 30.2% often or very often refer to or reuse them.

In terms of working with CSCCE outside of the course, 14 respondents (16.3%) have worked (or their organization has worked) with CSCCE on a consultancy project. **Fifty-two respondents (60.5%) had not worked with CSCCE on a consultancy project**, while the remaining 20 (23.2%) were unsure whether they had. We have not yet looked at whether those who worked with CSCCE report more positive outcomes in the survey.

Finally, **70 respondents (81.4%) had never taken another CSCCE training**. Ten each (11.6%) had taken a single workshop or another multi-week course, and four (4.7%) had taken a workshop series. While we didn't ask explicitly for the reasons behind this, we're anecdotally aware of a combination of factors including busy schedules, limits on professional development budgets, and needing time to implement the materials from CEF before taking additional training courses. All of these findings about course participation are reflective of the ongoing professionalization of scientific community management and the still relatively early stage of CSCCE's growth as an organization.

Research question 1: Application of CEF activities, concepts and frameworks

Respondents were asked four questions (including one open-ended question) about whether and how they have used CEF activities, concepts, and frameworks since graduating from the course. To aid in recall, we included a checklist of the significant activities, concepts, and frameworks that were covered during the course. We also included a checklist of potential ways that respondents have used or referenced CEF activities, concepts, and frameworks. Respondents could check all that apply or select “not applicable” or “other” to add their own response to both of these questions. To ensure strong internal validity of these responses, we also asked how *useful* respondents have found the CEF activities, concepts, and frameworks. We encouraged respondents to share specific examples of how they had used or referenced specific activities, concepts, or frameworks in their work via an open-ended question.

I) USE OF CEF ACTIVITIES, CONCEPTS AND FRAMEWORKS

Participants have applied CEF activities, concepts, and frameworks within their community management work through multiple different routes. **Eighty-two respondents (95.3%) have used multiple CSCCE frameworks, activities, or concepts in their work since CEF** (Table 3). The activities, concepts, and frameworks that respondents have most used or referenced in their work include, the CSCCE Community Participation Model (65, 75.6%), scaffolding to support member participation (62, 72.1%), aligning content and programming to member goals (45, 52.3%), and writing out member types/personas (45, 52.3%). The remaining activities and frameworks were also used, with between 26.7% and 44.2% of respondents marking them as useful. Only three respondents (3.5%) said that they have not used or referenced any of the CEF activities in their work.

In terms of *how* respondents have used or referenced CEF activities, concepts, and frameworks, 75 people (87.2%) have used the work in multiple ways (Table 4). **The most common ways that CEF materials were used were to improve overall community strategy (59, 68.6%), to improve existing content and/or programming (58, 67.4%), to develop new content and/or programming (55, 64%), and to build alignment with team members (48, 55.8%).**

Response	Count	Percentage
The CSCCE Community Participation Model	65	75.6%
Scaffolding to support member participation	62	72.1%
Aligning content and programming to member goals	45	52.3%
Member types/personas	45	52.3%
Content and programming audit	38	44.2%
Community overview statement	37	43.0%
The CSCCE Skills Wheel	37	43.0%
The Champion Mode of member participation	34	39.5%
Final graduation poster	32	37.2%

Community sketch	30	34.9%
Mapping content and programming to the CSCCE Community Participation Model	26	30.2%
Job description activity	24	27.9%
Community lifecycle models	23	26.7%
N/A - I have not used or referenced these CEF activities in my work	3	3.5%

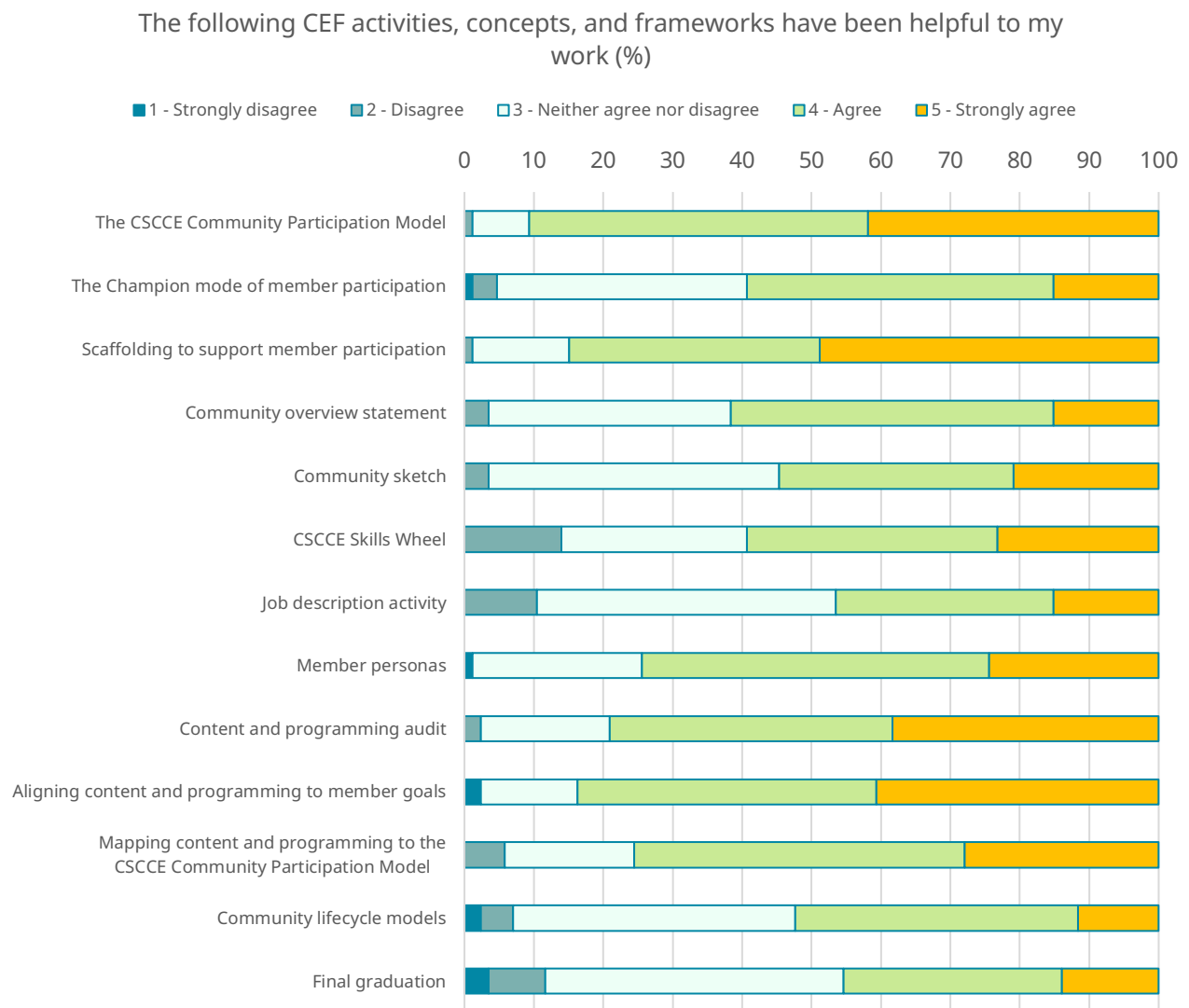
Table 3
Which of the following CEF activities, concepts, and frameworks have you used or referenced in your work since graduating? (Check all that apply).

Response	Count	Percentage
To improve overall community strategy	59	68.6%
To improve existing content and/or programming	58	67.4%
To develop new content and/or programming	55	64.0%
To build alignment with my team members	48	55.8%
To build alignment with my community members	42	48.8%
To develop a new community strategy	29	33.7%
To build alignment with my supervisor	28	32.6%
To build alignment with external communities / organizations	25	29.1%
To build alignment with funders (including in proposals)	12	14.0%
N/A - I have not used or referenced these things in my work	3	3.5%
Other	7	8.1%

Table 4
How have you used or referenced the CEF activities, concepts, and frameworks above in your community management work? (Check all that apply).

II) HELPFULNESS OF CEF ACTIVITIES, CONCEPTS AND FRAMEWORKS

Most of the CEF activities, concepts, and frameworks were found to be helpful by a majority of the respondents – **particularly the CSCCE Community Participation Model, scaffolding for member participation, and aligning content with member goals** (Figure 3).

**Figure 3**

Responses to "The following CEF activities, concepts, and frameworks have been helpful to my work:"

In detail, learners found specific CEF activities, concepts and frameworks useful as follows:

- The CSCCE Community Participation Model:** A large majority found this model beneficial to their work, with 90.7% (48.8% agree, 41.9% strongly agree) affirming its helpfulness. Only a single respondent found it unhelpful (1.2%, strongly disagree), and a few (8.1%) were neutral.
- The Champion mode of member participation:** More than half of the respondents (59.3%; 44.2% agree, 15.1% strongly agree) indicated that this model has been helpful to their work. However, a considerable number (36%) found it neither helpful nor unhelpful. This may reflect that champions programs are relevant at specific stages of community growth and learners may not have been in those stages.
- Scaffolding to support member participation:** Most participants (84.9%; 36% agree, 48.8% strongly agree) recognized this as a helpful model for their work, with only one respondent disagreeing (1.2%), and 14% remaining neutral.

- **Community overview statement:** This statement was seen as advantageous by a majority (61.6%; 46.5% agree, 15.1% strongly agree). A small group disagreed (3.5%), and a significant number (34.9%) did not have a strong opinion on its usefulness.
- **Community sketch:** More than half (54.7%; 33.7% agree, 20.9% strongly agree) found the community sketch helpful, although a large group (41.9%) did not express a clear stance, and a few (3.5%) disagreed with its usefulness.
- **CSCCE Skills Wheel:** This tool divided opinions; while 59.3% of respondents (36% agree, 23.3% strongly agree) found it helpful, 14% did not, and a considerable number (26.7%) were neutral. This may reflect that the tool as currently conceived is aimed at full time community managers and doesn't reflect domain expertise.
- **Job description activity:** The activity was moderately perceived as beneficial (46.5%; 31.4% agree, 15.1% strongly agree), but it also faced some disagreement (10.5%) and a significant level of neutrality (43%). This may relate to how accurate or not current job description are – if they exist at all – and the agency that learners feel in being able to request updates.
- **Member personas:** A majority (74.4%; 50% agree, 24.4% strongly agree) found creating personas helpful in their work, with only one strong disagreement (1.2%) and some neutrality (24.4%).
- **Content and programming audit:** This activity was well-received, with 79% respondents (40.7% agree, 38.4% strongly agree) acknowledging its helpfulness. A minority disagreed (2.3%) or remained neutral (18.6%).
- **Aligning content and programming to member goals:** This activity was highly valued, with 84% participants (43% agree, 40.7% strongly agree) finding it beneficial for their work. Only two strongly disagreed (2.3%), and a few (14%) were neutral.
- **Mapping content and programming to the CSCCE Community Participation Model:** The majority (75.5%; 47.7% agree, 27.9% strongly agree) appreciated this mapping for its usefulness in their work, though some were neutral (18.6%) and a few disagreed (5.8%).
- **Community lifecycle models:** Opinions were mixed, with 52% respondents (40.7% agree, 11.6% strongly agree) finding the models helpful, contrasted with some disagreement (7%) and a significant neutral response (40.7%).
- **Final graduation poster:** The responses varied, with 45% of respondents (31.4% agree, 14% strongly agree) acknowledging its helpfulness. However, there was notable disagreement (11.6%; 3.5% strongly) and a substantial neutral group (43%), indicating mixed perceptions of its utility. This could reflect the seniority of the learners within their organizations: This course artefact is specifically designed to help integrate the community manager's learning with that of their supervisor or other team members, so may be less relevant for those in more senior roles or for more established communities where the organization already has an engagement strategy.

III) EXAMPLES OF THE APPLICATION OF CEF ACTIVITIES, CONCEPTS AND FRAMEWORKS

We asked participants to share specific examples of how they have applied CEF activities, concepts, and frameworks in their work. **Notably, 58 respondents (68%) provided a written example.** Below

are some selected quotes that illustrate the nuances of how these materials have been helpful for improving overall community strategy and existing programming.

To improve overall community strategy:

- “The **concept of community sketching** was the most valuable to me. It put me in the right frame of mind to assess how the community exists, how it behaves, and what the goals are.”
- “The CSCCE community participation model & mapping content/programming exercise was one of the most eye-opening activities from the course. I’ve been using, updating, and referencing since we’ve created it during the course. This has been **helpful to restructure our organization in a more user/member-centric way to allow easier engagement from both the member’s perspective**, and it also helped the community managers know clearly who their audience are, what their needs are, and what we should expect from them. Really loved the model & activity!!”
- “The CSCCE Community Participation Model and mapping and aligning content and programming has **helped me develop our evolving strategy of shifting from closed and one to one support toward open and many to many support**, where applicable.”
- “[S]o far mostly **high-level planning** (changes we want to propose [with regards to] governance, ways of opening up leadership roles to the community).”
- “The framework as a whole has helped to understand the various needs of the cohort and enabled [me] to **identify the gaps in the programming and where needs are not being met and to plug those gaps appropriately. We never considered new members coming on board but we are developing an onboarding strategy.** The techniques applied during the teaching of the course such as capturing notes during breakouts and not forcing participants to share but offering the opportunity to do so has been very useful.”
- “**I consider scaffolding much more frequently** when deciding how to allocate my time when working in research collaborations and with participatory scientists”

To improve existing programming:

- “Across the multiple projects that contain “sub-communities”, what I have learned has helped tremendously in **engaging my different teams in developing and executing strategies that are specific to the member needs and goals associated with each sub-community.** It has also helped in engaging larger communities with various different and overlapping needs/goals, and it has **helped in more intentionally integrating JEDI frameworks** I’ve learned throughout my career because of the ways in which CEF concepts support disaggregation and inspection of member types and modes of engagement.”
- “The **graduation poster has helped as a benchmark reference for the existing activities and frameworks**, for me and my immediate team, we can easily spot what we need to modify to make the programming better.”
- “I have **used the program audit to track where we are dedicating our organizational development efforts, and where there are potential gaps.** Connecting programming to the community participation model has been helpful in identifying where community members

have the opportunity to collaborate or co-create. This thinking has been helpful in adjusting programming to be better in alignment with its intended purpose.”

- “Having a better understanding of the different ways that people might interact with my community has helped focus my efforts for engagement to not try and get everyone who interacts with the community to stay/become a champion. Instead, **we can focus on cultivating a robust champion team and building their skills** while staying accessible to all potential users.”
- “These concepts have helped myself and others refine existing programs, by **recognizing gaps in delivery or knowledge**; tools and learning to creat[e] new programs to better support our community.”
- “The community I managed at the time I took the course was one of open science infrastructure providers rather than researchers directly, and the community I am involved with and partly manage now is similar, so I find the overall CSCCE framework very helpful but some of the more specific activities don't necessarily align with my communities. **I have found the framework to be a great mental guide for structuring community work/calls and helping me think through challenges to engagement.**”
- “We often use and refer to the CSCCE Community Participation Model to describe the ways in which [REDACTED] engages with its community. It's incredibly helpful! CSCCE's Champion mode of member participation and scaffolding to support member participation have also been highly valuable. **I look forward to revisiting some of the other CEF activities, concepts, and frameworks in the future.** For me, limited time to implement these has been the biggest barrier, due to my part-time community manager role.”

Research question 2: Individual-level impact

Survey respondents were asked six questions (including two open-ended questions) about the impact of the CEF course on them individually. The questions ranged from asking about socio-emotional outcomes related to their work - such as feeling increased confidence in advocating for themselves and feeling more connected to others - through to specific career changes and other opportunities that have emerged since participating in the course.

I) INDIVIDUAL IMPACT FOR RESPONDENTS

Participating in CEF has positively impacted the respondents in several key areas of their professional roles as community managers (Figure 4). Most notably, **they reported increased confidence in their roles (87%), an improved ability to communicate about their work to others (87%), and a stronger sense of connection with their peers doing similar work (90%).**

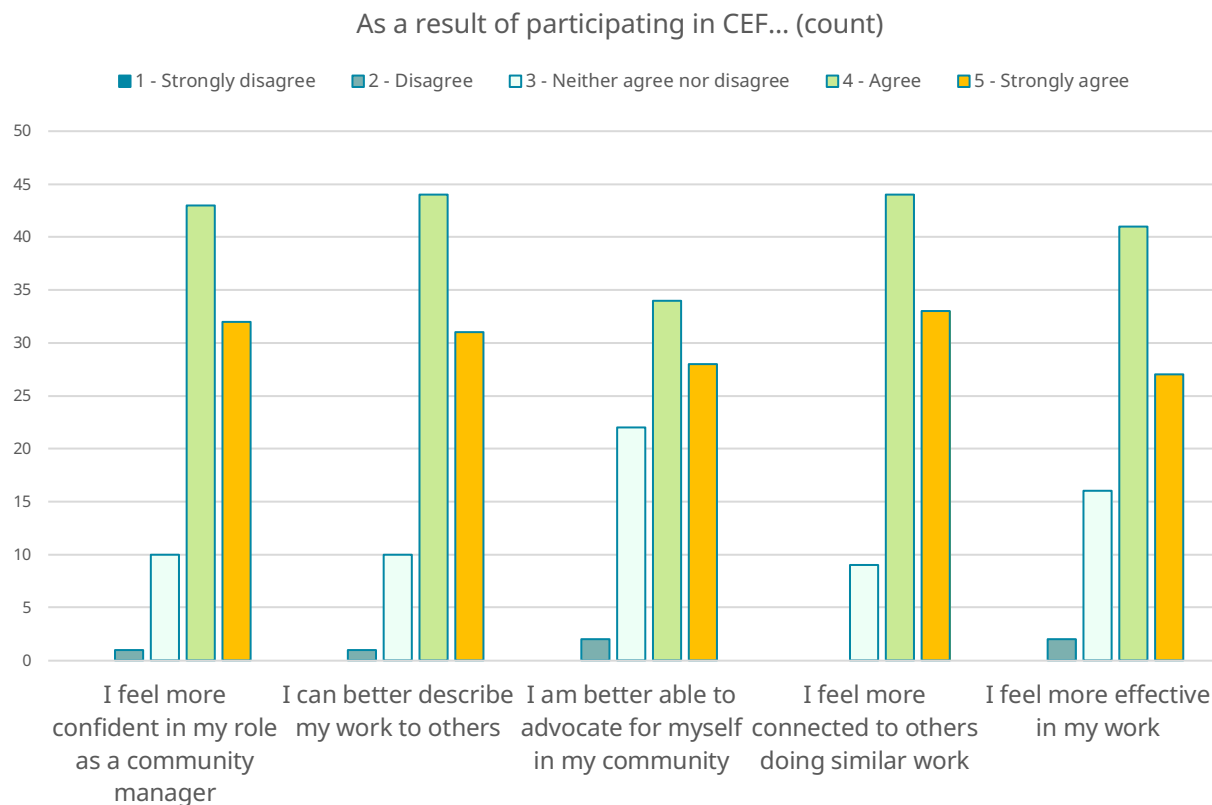


Figure 4
Responses to “As a result of participating in CEF...”

Figure 4 shows how respondents felt participation in CEF impacted them in the following ways:

- **Feeling more confident in the role as a community manager:** A significant majority of the respondents feel more confident in their role, with 87.2% of respondents either agreeing (50%) or strongly agreeing (37.2%). Only one respondent disagreed (1.2%), and a small group (11.6%) were neutral.

- **Ability to better describe work to others:** Similarly, 87.2% respondents (51.2% agree, 36% strongly agree) feel more capable of describing their work to others since participating in CEF. Only one respondent disagreed (1.2%), and 11.6% were neutral.
- **Better able to advocate for oneself in the community:** 72.1% of respondents feel better able to advocate for themselves (39.5% agree, 32.6% strongly agree), while two disagreed (2.3%) and 25.6% were neutral.
- **Feeling more connected to others doing similar work:** The sense of increased connection with peers was strongly felt, with 89.5% of respondents indicating they feel more connected to others in similar roles (51.2% agree, 38.4% strongly agree). No one disagreed, although 10.5% respondents were neutral.
- **Feeling more effective in work:** The effectiveness in work also saw a positive trend, with 79.1% of respondents feeling more effective (47.7% agree, 31.4% strongly agree). However, two disagreed, and 16 were neutral on this aspect.

These positive socioemotional outcomes are particularly important in an emerging profession such as community management, where individuals can often be the only one in their organization focusing on engagement activities. This can lead to feelings of isolation and even burnout. Furthermore, many STEM community managers have recently left academic research after gaining a PhD and are entering a new role without explicit prior training in the skills required, which can impact confidence and self-advocacy. That CEF is addressing these needs meets one of our goals for the course.

II) CAREER CHANGES SINCE TAKING CEF

When asked whether any specific career changes have occurred since taking CEF, 45 respondents (52.3%) indicated that they have not experienced a career change while 25 (29.1%) experienced multiple changes (Table 5). Of those who experienced a change, **22 (25.6%) received a salary increase, and 17 (19.8%) have received a promotion or increase in responsibilities.** Thirteen (15.1%) have a new or updated job description (something that we focus on during week two of CEF), and 11 (12.8%) have a new or updated job title. Seven (8.1%) have gotten a new community management job, and five (5.8%) have gotten new jobs in a different role.

It's reassuring to observe both the low churn rate away from community management roles *and* multiple signals that the roles (and the individuals doing them) are becoming more valued within their organizations. While we cannot conclude from the data that the CEF course directly caused an increase in awareness of the importance of community managers within their organizations, the course does intentionally address issues of updating job descriptions and equips learners with language to more clearly explain what they do. Having accurate role titles and descriptions is one important step towards institutionalizing these roles and one of CSCCE's goals in advancing our mission.

Response	Count	Percentage
N/A - I have not experienced any career changes since participating in CEF	45	52.3%
I received a salary increase	22	25.6%
I received a promotion and/or increase in responsibilities	17	19.8%
I have a new or updated job description that better describes my responsibilities	13	15.1%
I have a new or updated job title that better describes my role	11	12.8%
I have gotten a new community management job at another organization	7	8.1%
I have gotten a new job in a different type of role at a new organization	5	5.8%
Other	19	22.1%

Table 5
Have you experienced any of the following career changes since participating in CEF? (Check all that apply).

III) OPPORTUNITIES AS A RESULT OF TAKING CEF

Opportunities have emerged as a result of taking CEF in various ways for respondents (Table 6). Forty-nine respondents (60%) selected multiple of these outcomes from taking the course. The most common outcome was that **respondents implemented something suggested by another learner (38, 44.2%)** - a likely benefit of an emphasis on peer-to-peer learning and sharing during the course. **Trying a new tool that they learned about during CEF was almost as common (37, 43%),** and having a follow-up conversation about their work was the third most common outcome of those selected (35, 40.7%). **Almost a quarter of respondents (20, 23.3%) were approached by another community manager outside their cohort,** suggesting an additional benefit of continuing to belong to a shared community of practice on Slack where individuals can contact each other privately, if desired. While we do not know for certain how community managers found each other across cohorts, there are several ongoing mechanisms for making those connections, including browsing the [CEF alumni page on the CSCCE website](#) that learners can opt into upon graduation, or engaging in conversations in Slack such as work-out-loud threads designed to make knowledge and interests more visible to others in the shared space.

Response	Count	Percentage
I've implemented something suggested by another learner	38	44.2%
I've tried a new tool that I learned about during the course	37	43.0%
I've had a follow-up conversation about my work	35	40.7%
I've been approached by other community manager outside my cohort	20	23.3%
I've been invited to give a talk in another community	12	14.0%
I've found a co-working partner that I meet with regularly	10	11.6%
I've co-authored a new resource	10	11.6%
I've been invited to submit a grant with another organization	7	8.1%
Other	17	19.8%

Table 6
What, if any, other opportunities have emerged for you as a result of you taking CEF? (Check all that apply)

IV) OPEN-ENDED EXAMPLES OF INDIVIDUAL CHANGES EXPERIENCED AFTER TAKING CEF

We asked respondents to optionally **provide more details of any individual changes** they had experienced after CEF. **Forty-eight respondents (55.8%) provided a written answer.** Below are some selected quotes showcasing the range of effects that CEF had on learners.

- “CEF helped me refine and better define my own style and approach to community engagement and management. **While I had years of experience before CEF, I had not had a language to identify and communicate the skills I had developed.** Having this language and knowledge gave me space to develop more intentionally.”
- “I was able to articulate and understand how community managers are different from science communicators; **some of the skills I've learned have now become second nature** -- i.e. I have extremely organized notes that are scaffolded well for every meeting, I write clear intentions and purposes when drafting out strategy documents, and I'm able to confidently run zoom calls with my community that include an equal mix of socialization and actual work. **One of the biggest ways that I've grown is recognizing that I have the knowledge, experience, and skills to do my job well!**”
- “The most impactful part of this course was **meeting others in similar positions, and feeling validated** in the amount of time, energy and creativity it takes to manage these communities on top of our other day-to-day tasks. This **helped me communicate better with my manager and allocate our time resources more effectively.**”
- “My thinking about the communities of practice I manage has become **more organized and strategic**, and encouraged me to adapt the tools I was using previously.”

V) SUBSEQUENT INTERACTIONS WITH CEF CLASSMATES

In terms of subsequent interactions with CEF classmates, 52 respondents (60.5%) selected multiple options, indicating that they had interacted with classmates through several routes. **Respondents have engaged the most via CSCCE's public Slack channels (51, 59.3%). Thirty-six respondents (41.9%) have interacted with classmates at CSCCE's Community Calls. Twenty-two respondents (25.6%) have engaged directly via private messages in CSCCE's Slack workspace or via email.** Other interaction methods were less common. Twenty respondents (23.3%) have not interacted with classmates since the course finished.

Developing and maintaining professional connection is an important goal we have both for our CEF learners and for the members of our CoP in general. Community management tasks are often taken on by a single individual on a team (although community teams are becoming more common), making loneliness or isolation a frequent sensation for community professionals. Forging more connections with others in similar roles can help mitigate these feelings, which can lead an individual to burnout and ultimately leave a position. It is encouraging to see that respondents are making new connections, both within and beyond their CEF cohorts.

Research question 3: Community and organizational level impact

Survey respondents were asked three questions (including one open-ended question) about the impact of the CEF course on their community and/or organization. We intentionally mention both community and organization because typically if an organization (or other entity that is convening the community) is unclear about its community engagement strategy (e.g., because it’s unsure how or why members might engage with one another) then it’s unlikely to be able to increase member engagement in a meaningful and sustained way. That lack of clarity can arise from fundamental misperceptions about community building (e.g., it happens entirely organically; all members want to interact in the same way) that the community manager may need to address to receive the support and resources that they need to be successful. The CEF course is intended to equip community managers with tools not just to impact their community engagement directly, but to have the conversations within their organizations that lead to community success.

I) IMPACTS ON MEMBER ENGAGEMENT AS A RESULT OF TAKING CEF

Participants were asked about changes in member engagement that have occurred since applying concepts from the CEF course, specifically by describing engagement in the different modes of the CSCCE Community Participation Model (CPM, Figure 5). The CPM segments community engagement into four modes of increasing member involvement, from CONVEY/CONSUME, to CONTRIBUTE, to COLLABORATE, to CO-CREATE. It also includes the CHAMPION mode, in which emergent leaders take on additional activities to support the ongoing maintenance, growth and/or evolution of the community. The CPM is a CSCCE core framework that is taught during CEF.

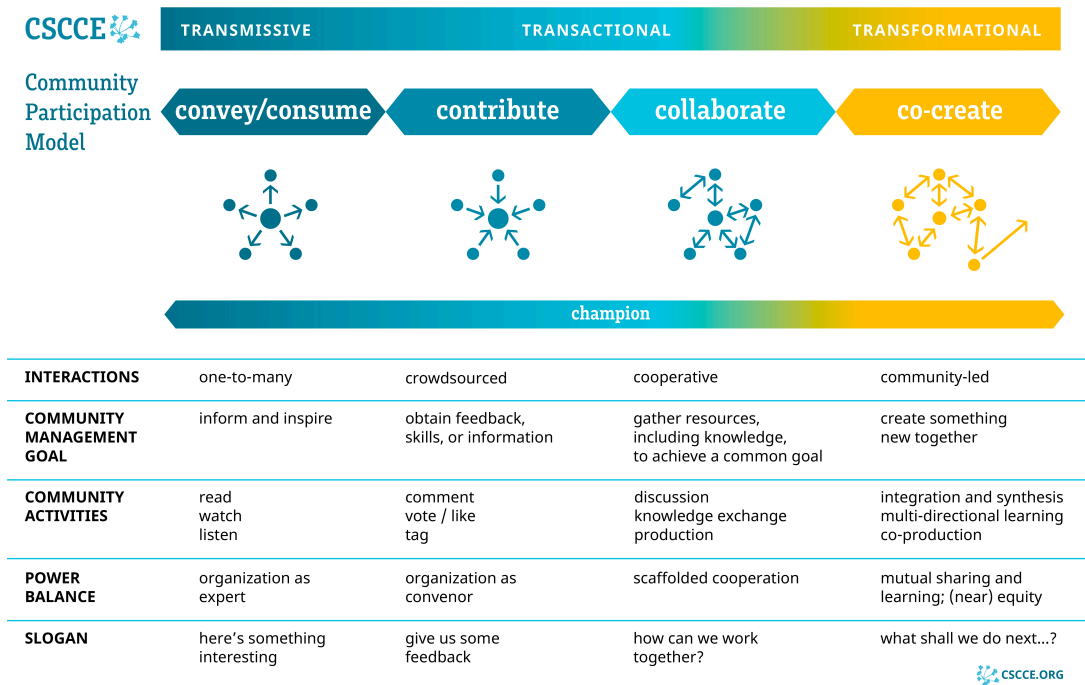


Figure 5
The CSCCE Community Participation Model. Citation: Center for Scientific Collaboration and Community Engagement. (2020) *The CSCCE Community Participation Model – A framework for member engagement and information flow in STEM communities*. Woodley and Pratt
doi:10.5281/zenodo.3997802

74% of respondents reported at least one improvement in member participation within their communities (Figure 6). Forty-four respondents (51.2%) selected multiple options, having seen improvement in multiple modes of the CPM. The highest improvement was seen in the CONVEY/CONSUME mode, with 31 respondents (36.0%) seeing improved participation. Twenty-eight (32.6%) saw improved participation in the COLLABORATE mode, while 26 (30.2%) did so in the CONTRIBUTE mode, and 25 (29.1%) in the CO-CREATE mode. Ten respondents (11.6%) saw improvement in the CHAMPION mode. Eleven respondents (12.8%) have not seen improvements and an additional eleven respondents no longer manage the same community. 13 (15.1%) responded “other.”

The number of respondents who observe increased engagement in a specific mode decreases as you move from left to right across the CPM, as the modes require more member interaction (i.e., CONVEY/CONSUME requires less member engagement than CO-CREATE). Many participants in CEF have communities that are in the early stages of their community lifecycle, which also typically correlates with more dependence on the CONVEY/CONSUME mode, and fewer community champions. It is therefore not surprising that the CHAMPION mode is the one where fewest learners report increases in engagement.

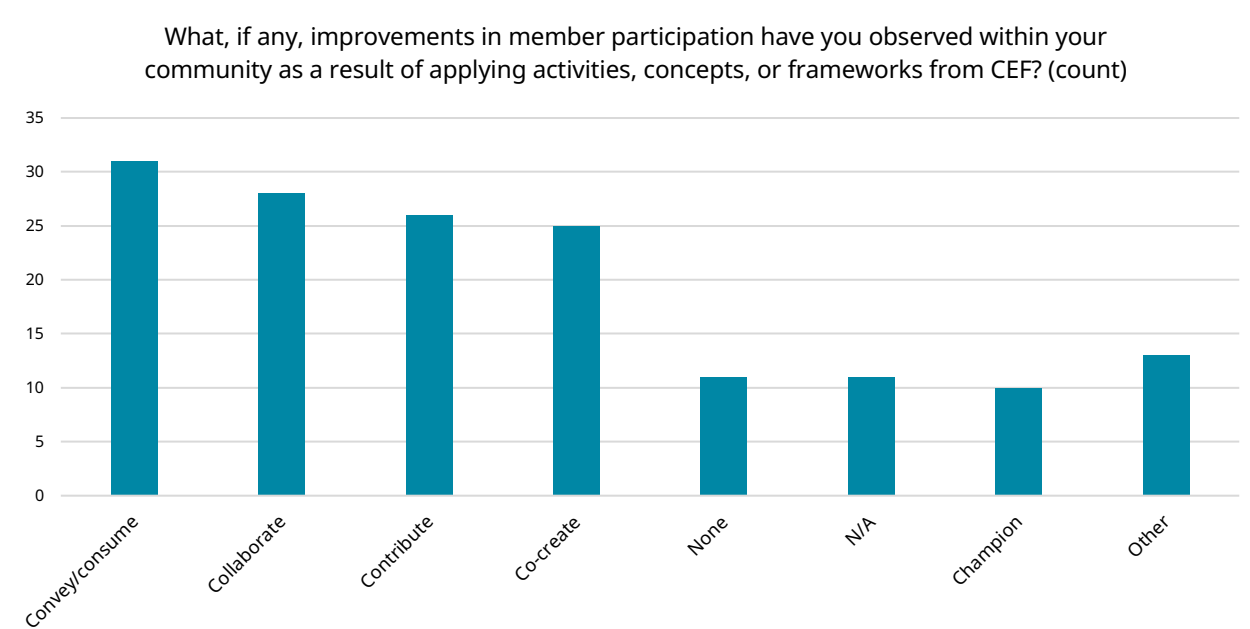


Figure 6
Responses to “What, if any, improvements in member participation have you observed within your community as a result of applying activities, concepts, or frameworks from CEF?”

II) IMPROVEMENTS WITHIN COMMUNITIES OR ORGANIZATIONS AS A RESULT OF TAKING CEF

Respondents were asked about additional improvements they might have observed within their communities or organizations as a result of taking CEF. 68 respondents (79.1%) selected multiple improvements. **The two top responses were development of scaffolding to support participation (49, 57.0%) and development of a community engagement strategy (41, 47.7%).** Participants saw

many other positive changes, some of which may reflect deeper strategic alignment at the organizational level such as having **increased clarity about the community’s shared culture and an increased understanding of the importance of community engagement**. Others, such as a **greater awareness of the power dynamics within the community** (18.6%) and **greater sense of belonging within a community** (18.6%) may reflect the knock-on DEI impacts of adopting the member-centric approach to community engagement described in the course.

Response	Count	Percentage
Development of scaffolding to support participation	49	57.0%
Development of a community engagement strategy	41	47.7%
Greater clarity about the community’s shared culture	32	37.2%
Increased understanding of the importance of community engagement	29	33.7%
Launched new programming	28	32.6%
Increased understanding of member types and their needs	27	31.4%
Greater sense of shared purpose amongst members	23	26.7%
Greater awareness of power dynamics within the community	16	18.6%
Increase in new members	16	18.6%
Greater sense of belonging amongst members	16	18.6%
Launched an evaluation activity	12	14.0%
Hiring additional community engagement staff	10	11.6%
Increase in the diversity of our membership	10	11.6%
Increase in retention of members	5	5.8%
Increase in funding allocated to community engagement	4	4.7%
Other	6	7.0%

Table 7
What, if any, other improvements have you observed within your community or organization as a result of applying activities, concepts, or frameworks from CEF? (Check all that apply).

III) OPEN-ENDED COMMENTS ABOUT COMMUNITY OR ORGANIZATIONAL-LEVEL IMPACTS OF CEF

We also asked an open-ended question about community- or organization-level impacts of CEF. There were 33 responses (38.4%) to this question. Some, outlined below, suggest organizational shifts in approach to community building at the strategic level (updating an engagement strategy and hiring additional staff). Others note shifts in sense of belonging and inclusion - as noted above, likely resulting from a more member-centric approach.

- “We have **completely overhauled our community engagement strategy** using frameworks, etc. from CEF, standardizing our approach to managing 15 different community roles. We plan

to implement that strategy in 2024. But **we are already seeing an increase in engagement from changes we have begun implementing.**"

- "We **hired additional staffing** in this area, and we've **used personas to inform other aspects of user engagement**, such as training."
- "We have gained feedback across all of our initiatives and our main programming that people from **marginalized groups feel more included and centered in our community.**"

Research question 4: Ecosystem-level impact

Survey respondents were asked three questions (including one open-ended question) about the impact of the CEF course at the ecosystem-level. Here we were interested in the role of the cohort-based structure of the CEF course and the interactive activities in opening up opportunities for learners to collaborate with one another in some form, or gain a better perspective on what else is happening in their shared domain space.

One way this has value from a community-building perspective is that it supports collaboration between community projects, which opens up new opportunities for members of those communities (as well as the staff, where applicable). This may reduce burnout of staff and community members by pooling resources to achieve common goals and also reducing the number of places they are being asked to spend time on projects with similar aims.

I) ECOSYSTEM-LEVEL IMPACT AS A RESULT OF TAKING THE CEF COURSE

Respondents were asked about changes that their community or organization may have experienced in relation to the broader STEM ecosystem as a result of applying concepts and frameworks from CEF. Thirty-three respondents (38.4%) selected multiple options, indicating improvements across multiple areas. Participants noted **improved communication with external stakeholders or communities (31, 36%)**, **greater clarity about their community's place within the broader STEM ecosystem (25, 29.1%)**, **new collaborations with external organizations or communities (23, 26.7%)**, and **improved collaborations with external organizations or communities (19, 22.1%)**. A smaller number reported an increased number of collaborative grant proposals (4, 4.7%).

Response	Count	Percentage
Improved communication with external stakeholders or communities	31	36.0%
Greater clarity about my community's place within the broader STEM ecosystem	25	29.1%
New collaborations with external organizations or communities	23	26.7%
Improved collaborations with external organizations or communities	19	22.1%
Increased number of collaborative grant proposals	4	4.7%
N/A	1	1.2%
Other...	2	2.3%

Table 8
What, if any improvements, have occurred to your community or organization's relationship to the broader STEM ecosystem as a result of applying concepts and frameworks from CEF?

II) FACTORS SUPPORTING ECOSYSTEM-LEVEL IMPACTS

These improvements were attributed to several factors, **including having more confidence to know what to do (49, 57.0%)**, **having shared language (32, 37.2%)**, **an increase in their personal network / visibility (32, 37.2%)**, an increase in visibility of their community / organization's work (29, 33.7%), having more internal support with their proposed approach(es) (25, 29.1%), having shared

frameworks to refer to (22, 25.6%), and having shared approaches (18, 20.9%). Fifty-two (60.5%) respondents selected multiple options.

Response	Count	Percentage
Having more confidence to know what to do	49	57.0%
Having shared language	32	37.2%
An increase in your personal network / visibility	32	37.2%
An increase in visibility of my community/organizations work	29	33.7%
Having more internal support with my proposed approaches	25	29.1%
Having shared frameworks to refer to (e.g., the Community Participation Model)	22	25.6%
Having shared approaches (e.g., a content calendar)	18	20.9%

Table 9
What, if any, factors have supported any ecosystem-level impacts that you have observed? (Check all that apply).

The combination of positive socio-emotional effects such as increased confidence along with shared language, frameworks and approaches powerfully equips community managers who’ve graduated from the CEF course with the ability to collaborate with other graduates. There are also individual and organizational benefits of increased visibility which highlights the importance of the highly participant-centered course structure in creating impacts across multiple levels.

III) OPEN-ENDED RESPONSES ABOUT ECOSYSTEM-LEVEL IMPACTS OF TAKING CEF

We also asked for a written text response about ecosystem-level impacts of CEF. There were 22 responses (25.6%) to this question. We’ve selected a few responses that display the types of answers respondents gave:

- “Our strategy has changed in community engagement (for the better). **We are the gold standard for [similar institutions] and our peer institutions are asking how we do it.** We have shared some of our early steps to help them get started.”
- “Provided [a] framework to **better report our successes to our stakeholders**, as well as our plans to our community members.”
- “We have **co-organized outreach activities with peer organizations with the help of our community champions**, giving them the opportunity to engage with other industry players.”

These responses suggest that by participating in CEF, individual community managers are starting to also connect with other similar organizations and activities across the STEM ecosystem, thanks in part to now having a shared language. This more systems-level approach will be crucial to sustaining community efforts across the ecosystem as individual organizations continue to explore community-building and deeper member engagement, risking duplication of effort. Community managers can be a key node in building higher order alignment.

Research question 5: Other resources, activities, or trainings

OTHER RESOURCES, ACTIVITIES, OR TRAININGS AND OTHER THOUGHTS ABOUT PROFESSIONAL DEVELOPMENT

We asked participants to optionally respond to **list existing resources, activities, or trainings they have found useful in their work outside of CSCCE's resources**. Forty people (46.5%) responded, sharing books, trainings, organizations, resources, and thought leaders that they've found helpful in their work. Topics included: advocacy, career development, change management, community engagement, cultural competency, event planning, facilitation, implementation science, management, open science, project management, sustainability planning, team science, and user experience. Below is a list of the resources mentioned, organized by type.

Books

- Art of Gathering by Priya Parker
- Don't Make Me Think! by Steve Krug
- Management in a Changing World: How to Manage for Equity, Sustainability, and Results by The Management Center
- The Power of Lift by Melinda Gates
- Thinking in Systems by Donella Meadows

Trainings

- FabRiders workshops
- Institute for Conservation Leadership's guides and workshops on facilitation
- Intercultural communication training
- Jumpstart Sustainability Workshop by Science Gateways
- Lean six sigma
- TOP Facilitation Methods from ICA

Organizations / websites

- ecsite.eu
- Open Life Science
- Open Steeds
- Process Educators
- The Management Center
- The Turing Way
- Feverbee
- forrt.org
- i2insights.org

- itd-alliance.org
- Liberating Structures
- NASA Transform to Open Science

Miscellaneous resources

- CZI's conflict management resources
- Pullias Center's Change Leadership Toolkit: A Guide for Advancing Systemic Change in Higher Education
- Science of Team Science literature
- Session Lab Library of Workshop Activities
- Cydnee DeToy Coaching
- ARDC Skills Summit
- Bioinformatics Education Summit

Thought leaders

- Adam Grant
- adrienne maree brown
- Alice Wong
- Audre Lorde
- bell hooks
- Beronda Montgomery
- Chanda Prescod-Weinstein
- David Spinks
- Gloria Anzaldua
- Imani Barbarin
- Kimberle Crenshaw
- Patricia Hill-Collins
- Sandra Soto
- Shani Dellimore Barrax
- Sirma Bilge

FINAL COMMENTS

There were 34 responses to the final open-ended question, asking respondents if they had anything else they'd like to share. These cluster into four categories, outlined below, plus an "other" category.

General gratitude for CSCCE's approach

- "Thank you for creating this community space and doing a great job of modeling what an inclusive and engaged community is like!"
- "Thank you, your work is very much appreciated."
- "I really appreciate the effort put into collating and summarizing conversations so that everyone can benefit. I can't participate in most activities because of the time zone, and this gives me a way to stay connected and up-to-date with best practices."
- "Thank for your continuing this undervalued work!"
- "CSCCE is such a valuable organization: the training is something I recommend to anyone doing similar work; the resources form one of my first ports of call for community management ideas, tools, and information, and the community/connection aspect, though one I'm not taking advantage of regularly, is important for recognition that community management is a job that matters, and needs serious attention. Thank you for all your work!"

Appreciation for CSCCE's CoP

- "You have built an incredible network of STEM community managers -- has been extremely valuable. Thanks!"
- "Thank you for creating such a wonderful space for scientific community managers!"
- "I am so thankful for the CSCCE community! There have been countless times where I have referred to the CSCCE and what I have learned through the community, or that I have had a question, used the search function in Slack to find resources, or found resources on the CSCCE website."

Valued training, career development support and help defining the profession

- "I really love your work! Thank you so much for being there. You really make a difference for our field. I would have felt very lonely and unhappy in my job without CSCCE."
- "These resources have been so vital to both my personal and professional growth, and overall experiences finding my way in my career!"
- "Really enjoy the PPD and training you provide, it's been helpful both for myself and my team, so thank you for your good work!"
- "This was a really positive experience that was so grounding in the depth of the pandemic, but has continued to help me connect and has given me resources that I refer to often. Thank you!"
- "Keep up the great work! I keep recommending CEF as I come across science community managers who don't realize that they are science community managers."

- “It is such a great program! There are very few other resources that have helped me with community management work than CEF and I will definitely attend more programming.”
- “I have recommended this course (and resources) to countless colleagues who are (like I was) struggling to find language and clarity on how to be a community manager when that's part of their role, but not explicitly.”
- “Great job and I recommend the course to others. It is still early days for us but we continue to use the resources and learnings to develop our communities further.”
- “I appreciate that this program exists at all. I am still new to this world so I will likely have more to contribute to this question in a few years.”
- “Looking forward to attending other CoP [events] and trainings where possible.”
- “The benefits of CEF continue to manifest and evolve for our CoP, and I suspect over time, I will be able to report higher-level impacts (so I'd be happy to engage in future repeats of this survey).”
- “I still recommend [CEF] to others! I hope you see additional participants from my previous org. Community engagement can be diffuse, many are still involved in a volunteer effort (like myself), but this falls outside the scope of many of these questions.”
- “The program is a very good source of knowledge about communities of practices - I learned a lot about a practice I have not considered before.”

Valued consultancy / thought partnership

- “In addition to CEF, I've partnered with CSCCE through a consultancy -- and I saw them as an essential thought partner who treated my project as if it was also theirs -- they truly felt like the dream team members that I wish I had internally. I left every meeting with CSCCE energized and driven to do more for my community. I credit the success of the programs I ran at that organization to having guidance from CSCCE.”

Other

- “It's very helpful to learn [to] reframe your perspective and learn what tools you might be missing.”
- “In the CoPs I manage, rallying around science/tech policy advocacy or requests for input that could influence science/tech policy really gets people excited and engaged. I'm thinking about how to better integrate policy tracking into my and my org's workflow for this reason.”
- “The program has been extremely helpful in understanding scientific community management. One of the reasons that I have not been using many of the tools in my work was that we received a new grant in our work, which is focused on research, and the work of community management has been shifted to one of my colleagues. I hope that after setting up the tasks for the new grant, I become more involved with community management in my work and revisit the concepts and tools in my work more frequently.”
- “I think CSCCE is an exceptional resource and I wish I could participate in trainings even without an active community to manage. But when [I] complete my training, I hope to come back to the fold.”

Appendix: Survey questions

This Appendix lists the survey introduction and individual questions, organized into the different survey sections.

Introduction

Thanks to funding from the Chan Zuckerberg Initiative (CZI), CSCCE is conducting a survey to learn more about the **medium-term and long-term impacts that the Community Engagement Fundamentals course (CEF) has had on individual course participants, their communities and/or organizations, and the broader STEM ecosystem**. The purpose of this survey is to help CSCCE continue making the case for community management training and adjust our offerings to address emergent needs, if necessary.

Your responses are confidential and only CSCCE staff have access to the individual responses. CSCCE staff will aggregate and summarize the survey results in a report that will be shared on the CSCCE website and Zenodo. CSCCE will also host a community call to discuss the report's findings. We hope that the report will enable community managers to better articulate the benefits of short-form training such as CEF.

The survey should take between 15 to 20 minutes to complete and includes the following sections:

- About you
- CEF activities, concepts, and frameworks
- Individual impact
- Organizational-level impact
- Ecosystem-level impact
- Other resources, activities, or trainings

Each section includes a mix of close-ended and open-ended questions. The latter are optional, but we encourage you to use these spaces to provide specific examples and additional nuance.

As an incentive, you can opt-in to enter a raffle for a FREE ticket to a CSCCE Mini-workshop in 2024. To opt-in, email the code shared upon survey completion to training@cscce.org.

DEADLINE: Monday, 8 January 2024

Please contact training@cscce.org if you have any questions, comments, or concerns.

About you

Below are questions about you, your CEF cohort, your community, and participation in other CSCCE activities.

1. Which CEF cohort did you participate in? [DROPDOWN] You can find your cohort name in the survey email greeting. Cohort names are an abbreviation of the course name, year, and season it took place, or the sponsor or location.

For example:

CEF20F = Community Engagement Fundamentals, 2020, Fall

CEF22AUS = Community Engagement Fundamentals, 2022, Australia

- a. CEF20F
 - b. CEF21W
 - c. CEF21W2
 - d. CEF21S
 - e. CEF21F
 - f. CEF22W
 - g. CEF22Sp
 - h. CEF22S
 - i. CEF22CZI
 - j. CEF22F
 - k. CEF23W
 - l. CEF23AUS
 - m. CEF23Sp
 - n. CEF23CZI
 - o. CEF23F
2. Which country are you located in?
Short answer text response
3. What type of community do you manage? (Check all that apply).
- a. A community of fiscally sponsored projects
 - b. A community of grantees
 - c. A community related to an open source software project
 - d. A community of practice
 - e. Core facility users
 - f. Members of a professional association / scientific society
 - g. Members of a research collaboration
 - h. Prefer not to disclose

- i. Other
4. What is the primary domain or field of your community / organization? (Check all that apply).
- a. Artificial intelligence
 - b. Biology
 - c. Chemistry
 - d. Computing
 - e. Data science
 - f. Diversity, equity, and inclusion
 - g. Engineering
 - h. Environmental science
 - i. Genomics
 - j. Interdisciplinary research
 - k. Medicine
 - l. Open source
 - m. Open research
 - n. Physics
 - o. Public health
 - p. Mathematics
 - q. Neuroscience
 - r. Scholarly communications
 - s. Social sciences
 - t. Software development
 - u. STEM education
 - v. Training / professional development
 - w. Prefer not to disclose
 - x. Other...
5. Where do your members convene? [RADIO BUTTON]
- a. Exclusively in-person
 - b. Mostly in-person
 - c. Hybrid
 - d. Mostly online
 - e. Exclusively online
 - f. Prefer not to disclose
6. How did you learn about CSCCE's Community Engagement Fundamentals course? (Check all that apply).

- a. A coworker / colleague
 - b. A friend
 - c. A supervisor
 - d. A CSCCE staff member
 - e. CSCCE newsletter or Slack announcement
 - f. CSCCE social media post
 - g. A non-CSCCE listserv, newsletter, or Slack announcement
 - h. A non-CSCCE social media post
 - i. Internet search
 - j. Prefer not to disclose
 - k. Other...
7. Have any members of your team taken Community Engagement Fundamentals? (Check all that apply).
- a. Yes, my supervisor has taken CEF
 - b. Yes, a colleague at my organization has taken CEF
 - c. Yes, a member of my immediate team has taken CEF
 - d. No
 - e. Not sure
 - f. Not applicable
 - g. Prefer not to disclose
8. Since completing CEF, how often have you engaged in the following activities within the CSCCE Community of Practice? (matrix)
- a. Rows:
 - i. Posting on Slack
 - ii. Connecting with others in the CSCCE CoP (e.g., Donut coffee chats)
 - iii. Attending monthly community calls
 - iv. Participating in working groups
 - v. Participating in special interest groups
 - vi. Reading the weekly Slack round-up
 - vii. Reading the monthly CSCCE newsletter
 - viii. Referencing or reusing CSCCE resources on Zenodo
 - b. Columns
 - i. 1 - Never
 - ii. 2 - Rarely
 - iii. 3 - Sometimes
 - iv. 4 - Often

v. 5 - Very often

9. Have you or anyone from your community / organization worked with CSCCE on a consultancy project? [RADIO BUTTON]
 - a. Yes
 - b. No
 - c. Not sure
 - d. Prefer not to disclose

10. Have you taken other CSCCE trainings? [RADIO BUTTON]
 - a. Yes, another multi-week course (e.g., NOC, CODE)
 - b. Yes, I've taken a single workshop
 - c. Yes, I've taken a workshop series
 - d. No
 - e. Prefer not to disclose

CEF activities, concepts and frameworks

Below are questions about how you have applied CEF activities, concepts, and frameworks within your community management work.

1. Which of the following CEF activities, concepts, and frameworks have you used or referenced in your work since graduating? (Check all that apply).
 - a. The CSCCE Community Participation Model
 - b. The Champion Mode of member participation
 - c. Scaffolding to support member participation
 - d. Community overview statement
 - e. Community sketch
 - f. The CSCCE Skills Wheel
 - g. Job description activity
 - h. Member types/personas
 - i. Content and programming audit
 - j. Aligning content and programming to member goals
 - k. Mapping content and programming to the CSCCE Community Participation Model
 - l. Community lifecycle models
 - m. Final graduation poster
 - n. N/A - I have not used or referenced these CEF activities in my work
 - o. Other...

2. How have you used or referenced the CEF activities, concepts, and frameworks above in your community management work? (Check all that apply).

- a. To build alignment with my supervisor
- b. To build alignment with my team members
- c. To build alignment with my community members
- d. To build alignment with external communities / organizations
- e. To build alignment with funders (including in proposals)
- f. To improve existing content and/or programming
- g. To develop new content and/or programming
- h. To improve overall community strategy
- i. To develop a new community strategy
- j. N/A - I have not used or referenced these things in my work
- k. Other...

3. The following CEF activities, concepts, and frameworks been helpful to my work:

a. Rows:

- i. The CSCCE Community Participation Model
- ii. The Champion mode of member participation
- iii. Scaffolding to support member participation
- iv. Community overview statement
- v. Community sketch
- vi. CSCCE Skills Wheel
- vii. Job description activity
- viii. Member personas
- ix. Content and programming audit
- x. Aligning content and programming to member goals
- xi. Mapping content and programming to the CSCCE Community Participation Model
- xii. Community lifecycle models
- xiii. Final graduation

b. Columns:

- i. 1 - Strongly disagree
- ii. 2 - Disagree
- iii. 3 - Neither agree nor disagree
- iv. 4 - Agree
- v. 5 - Strongly agree

4. Please describe how you have applied the CEF activities, concepts, and frameworks above in your community management work.

E.g., "The concept of community champions has helped me develop a new program focused on supporting and acknowledging volunteers within my community who were previously underrecognized. I also used the community overview statement to revamp our website."

Long-answer text response

Individual impact

Below are questions about changes that you may have experienced as an *individual* after participating in CEF.

1. As a result of participating in CEF... [agree-disagree LIKERT scale]
 - a. Rows:
 - i. I feel more confident in my role as a community manager
 - ii. I can better describe my work to others
 - iii. I am better able to advocate for myself in my community
 - iv. Feel more connected to others doing similar work
 - v. I feel more effective in my work
 - b. Columns:
 - i. 1 - Strongly disagree
 - ii. 2 - Disagree
 - iii. 3 - Neither agree nor disagree
 - iv. 4 - Agree
 - v. 5 - Strongly agree
2. Have you experienced any of the following career changes since participating in CEF? (Check all that apply).
 - a. I received a promotion and/or increase in responsibilities
 - b. I received a salary increase
 - c. I have a new or updated job description that better describes my responsibilities
 - d. I have a new or updated job title that better describes my role
 - e. I have gotten a new community management job at another organization
 - f. I have gotten a new job in a different type of role at another organization
 - g. N/A - I have not experienced any career changes since participating in CEF
 - h. Other...
3. What, if any, other opportunities have emerged for you as a result of you taking CEF? (Check all that apply).

- a. I've had a follow-up conversation about my work
- b. I've tried a new tool that I learned about during CEF (e.g., Padlet, Gather)
- c. I've implemented something suggested by another learner
- d. I've been invited to give a talk in another community
- e. I've found a co-working partner that I meet with regularly
- f. I've co-authored a new resource
- g. I've been invited to submit a grant with another organization
- h. I've been approached by other community managers outside my cohort
- i. N/A

4. Please describe any individual-level changes you may have experienced after participating in CEF, and how participating in CEF may have contributed to those changes.

Long-answer text response

5. Since participating in CEF, how and where have you interacted with your CEF classmates? (Check all that apply).

- a. CSCCE Community Calls
- b. CSCCE's public Slack channels
- c. Via direct messages using CSCCE's Slack workspace
- d. Via direct message using other platforms
- e. Via email
- f. Via social media
- g. In-person meetings, events, or conferences
- h. Virtual meetings, events, or conferences
- i. Informal in-person meet ups
- j. Informal virtual meetups
- k. N/A - I have not interacted with classmates since graduating
- l. Other...

6. Please describe any interactions you have had with CEF classmates since participating in CEF and how those interactions or relationships have impacted you or your CM work.

You are welcome to describe interactions with other members of the CSCCE Community of Practice here, as well.

E.g., "I joined the CSCCE Working Group about community champions and met several others in the CSCCE CoP who are experiencing similar challenges with launching new programs. We helped co-author two tip sheets and I still continue to meet with members of the working group."

Long-answer text response

Organizational-level impact

Below are questions about changes that your *community or organization* may have experienced after you participated in CEF.

1. What, if any, improvements in member participation have you observed within your community as a result of applying activities, concepts, or frameworks from CEF?

These improvements may be quantitative, qualitative, and/or anecdotal.

- a. Improved participation within the CONVEY/CONSUME mode (e.g., greater attendance during regular programming; greater newsletter click-through rates)
- b. Improved participation within the CONTRIBUTE mode (e.g., an increase in the number of active members, posts, discussions)
- c. Improved participation within the COLLABORATE mode (e.g., an increase in the number or quality of participation on working groups, special interest groups, advisory boards, etc)
- d. Improved participation within the CO-CREATE mode (e.g., an increase in community-generated resources; the development of team projects or inter-member collaborations.)
- e. Improved participation within the CHAMPION mode (e.g., greater number of applicants to champions programs)
- f. None - I have not seen any improvements related to member participation
- g. N/A - I no longer manage the same community
- h. Other...

2. What, if any, other improvements have you observed within your community or organization as a result of applying activities, concepts, or frameworks from CEF? (Check all that apply).

These improvements may be quantitative, qualitative, and/or anecdotal.

- a. Development of a community engagement strategy
- b. Development of scaffolding to support participation
- c. Greater sense of shared purpose amongst members
- d. Greater sense of belonging amongst members
- e. Greater clarity about the community's shared culture
- f. Greater awareness of power dynamics within the community
- g. Hiring additional community engagement staff
- h. Increase in funding allocated to community engagement
- i. Increase in new members
- j. Increase in retention of members
- k. Increase in the diversity of our membership
- l. Increased understanding of the importance of community engagement
- m. Increased understanding of member types and their needs

- n. Launched new programming
 - o. Launched an evaluation activity
 - p. N/A
 - q. Other...
3. Please describe any community-level or organizational-level changes that have occurred since participating in CEF, and how participating in CEF may have contributed to those changes.
- E.g., "Since formalizing our champions program, we've had a 25% increase in applications. By referencing the CEF course and Champions guidebook, I was also able to convince my supervisor to allocate funds for an annual award ceremony to acknowledge their contributions. I've noticed that this has considerably boosted morale."*

Ecosystem-level impact

Below are questions about changes that your community or organization may have experienced in relation to the broader STEM ecosystem after you participated in CEF.

1. What, if any improvements, have occurred to your community or organization's relationship to the broader STEM ecosystem as a result of applying concepts and frameworks from CEF? These improvements may be quantitative, qualitative, and/or anecdotal.
- a. Greater clarity about my community's place within the broader STEM ecosystem
 - b. Improved collaborations with external organizations or communities (e.g., changes to joint programming)
 - c. New collaborations with external organizations or communities (e.g., new joint programming)
 - d. Improved communication with external stakeholders or communities (e.g., knowledge sharing)
 - e. Increased number of collaborative grant proposals
 - f. N/A
 - g. Other...
2. What, if any, factors have supported any ecosystem-level impacts that you have observed? (Check all that apply).
- a. Having shared frameworks to refer to (e.g., the Community Participation Model)
 - b. Having shared language (e.g., scaffolding, champions programs)
 - c. Having shared approaches (e.g., a content calendar)
 - d. Having more confidence to know what to do
 - e. Having more internal support with your proposed approach(es)
 - f. An increase in your personal network / visibility
 - g. An increase in visibility of your community/organization's work

h. Other...

3. Please describe any ecosystem-level changes that have occurred since participating in CEF, and how participating in CEF may have contributed to those changes.

E.g., "When we were developing our new champions program, we realized that some of our participants were interested in additional training. Instead of developing a new training program ourselves, we were able to partner with an existing training organization that I had identified as an external stakeholder on my community sketch during CEF."

Long-answer text response

Other resources, activities, or trainings

Below are questions about other resources, activities, or training for community management work.

1. What existing resources, activities, or trainings have you found useful to your work that come from outside of CSCCE's trainings and Community of Practice?

E.g., books, articles, workshops, conferences, etc.

Long-answer text response

2. What additional types of resources, activities, or trainings would you find useful to your work in the future?

Long-answer text response

3. Is there anything else you would like to share about CSCCE, CEF, or professional development for community managers in general?

Long-answer text response

Reference List

Center for Scientific Collaboration and Community Engagement. (2020) The CSCCE Community Participation Model – A framework to describe member engagement and information flow in STEM communities. Woodley and Pratt doi: [10.5281/zenodo.3997802](https://doi.org/10.5281/zenodo.3997802)

Center for Scientific Collaboration and Community Engagement. (2021) The CSCCE Community Participation Model - Exploring the Champion mode. Woodley and Pratt doi: [10.5281/zenodo.5275270](https://doi.org/10.5281/zenodo.5275270)

Center for Scientific Collaboration and Community Engagement. (2022) The CSCCE Community Participation Model - Scaffolding to lower barriers to participation in STEM communities. Woodley, Pratt, and Santistevan doi: [10.5281/zenodo.6078934](https://doi.org/10.5281/zenodo.6078934)