

# EVALUATION REPORT FOR SAGE 2YC COHORT 3 IMPLEMENTATION

*Faculty as Change Agents: Transforming  
Undergraduate Geoscience Education in  
Two-Year Colleges*

*Pamela Eddy, William & Mary  
Kristin O'Connell, SERC, Carleton College*

*This work was supported by the National Science Foundation Division of Undergraduate Education through grants DUE 1525593, 1524605, 1524623, 1524800, and 1835935. Any opinions, findings, conclusions or recommendations expressed are those of the authors and do not necessarily reflect the views of the National Science Foundation.*

## EXECUTIVE SUMMARY

This report evaluates the year-long virtual professional development program involving 45 Change Agents (CAs) on 16 teams and 13 Peer Leaders (PL). Programming involved a series of synchronous and asynchronous sessions throughout the 2020 year. In the spring, a series of 12 sessions were offered that included topics supporting the three strands of the project (supporting student success, broadening participation, and building career pathways). The PLs also offered peer consultations and supported the PD through contributions to discussion boards and support of the synchronous sessions. As well, the PLs received targeted training on leadership topics to help advance their own development. The summer workshop provided the PLs the opportunity to deliver workshop sessions to the CAs, and the CAs had the opportunity to share their progress on their team action plans. Finally, the fall semester involved a series of sessions to improve implementation into practice, book clubs, and a session on undergraduate research. During the fall 2020 semester/term, the CAs conducted PD sessions on their campuses. A culminating event hosted in December provided the CAs an opportunity to reflect on team and individual accomplishments, to respond to prompts on their actions on campus in response to COVID-19, and to comment on their leadership development.

The evaluation found that individual CAs noted the following changes as a result of participating in the program: Increased confidence; Building a national network with CAs and PLs; Changes to their teaching practices. Likewise, the PLs found more confidence in their ability to lead, with several obtaining increased leadership responsibilities on campus. The PLs especially saw value in having opportunities to lead workshops independently and in working with other PLs. This group also noted continued improvement in their own teaching practices.

COVID-19 significantly affected campus operations across the nation. The CAs found value in their exposure to online technologies in the program that helped them pivot to remote teaching. Scant attrition occurred among the group, as they found value in having an opportunity to continue to learn and share strategies with others facing similar circumstances on their campus. The increased stipend available to this group because all PD was conducted virtually may have influenced the retention of the CAs, yet this was not noted as a stated motivation or as a value received from their participation.

Conclusions and recommendations emerging from this evaluation include: 1) long-term engagement in PD provides opportunities for continuous learning as new strategies are tried in practice; 2) an organized structure and planning for the PD influenced expectations as there was predictability and value in what was delivered; 3) exposure to evidence-based strategies and the opportunity to discuss with others their experiences contributed to learning; 4) leading sessions for others provided participants more depth of understanding and expanded the diffusion of exemplary practices on campus.

## Table of Contents

Executive Summary.....	2
1. Introduction.....	4
2. The Cohort 3 Faculty Change Agents .....	5
3. The Cohort 3 Virtual PD Experience.....	13
4. What and How C3 Change Agents Change .....	22
5. Leadership development—Change Agents.....	30
6. Campus-Based PD .....	36
7. The Peer Leader Experience.....	38
8. Theory of Change .....	53
9. Lessons learned and recommendations .....	55

## LIST OF TABLES

Table 2-1: Summary of team composition and distribution.....	6
Table 2-2: C3 discipline distribution .....	7
Table 2-3: Summary of Minority Serving Institutions (MSI's).....	8
Table 2-4: Institutional enrollment IPEDS data.....	9
Table 3-1: Cohort 3 Workshop Program Summer 2020 ( <a href="https://serc.carleton.edu/237014">https://serc.carleton.edu/237014</a> ).....	15
Table 3-2: Cohort 3 Workshop Program Fall 2020 ( <a href="https://serc.carleton.edu/239099">https://serc.carleton.edu/239099</a> ).....	16
Table 4-1: Reported changes in teaching practices .....	26
Table 6-1: Campus based workshop sessions.....	36
Table 6-2: summary table of regional workshops (C1, C2) and campus workshops (C3) .....	38

## LIST OF FIGURES

Figure 2-1: Geographic distribution of SAGE cohorts .....	7
Figure 3-1: PD overview .....	13
Figure 3-2: Cohort 3 Workshop Program Spring 2020 ( <a href="https://serc.carleton.edu/235288">https://serc.carleton.edu/235288</a> ).....	15
Figure 3-3: Workshop satisfaction ratings .....	17
Figure 3-4: Program session ratings.....	17
Figure 3-5: Cohort 1, 2, and 3 Faculty CA Responses to Community of Practice Questions .....	18
Figure 3-6: Comparison of SAGE 2YC CAs to 2016 National Geoscience Faculty Survey .....	19
Figure 4-1: Value of types of engagement.....	24
Figure 4-2: Perceived influence of CA experience .....	25
Figure 4-1: Peer leader role overview.....	44
Figure 8-1: Cohort 3 enactment of ToC .....	54

## I. INTRODUCTION

The SAGE 2YC Cohort 3 (C3) group of participating Change Agents (CA) and Peer Leaders (PL) provided an opportunity to extend prior iterations of the SAGE 2YC Professional Development (PD) in a new format. Differences in the C3 program included: 1) an entirely virtual PD program conducted in a condensed one-year timeframe; 2) CA teams that included non-geoscience team members; 3) the use of PLs to help with delivery of PD and as mentors/coaches for the C3 teams, and 4) campus CA-led events rather than the regional events hosted in prior cohorts of CAs. An additional unplanned difference emerged as the onset of the COVID-19 pandemic began in March 2020, leading to rapid shifts in teaching modality.

The overarching question of the evaluation is: *How do CAs perceive changes to their work and influence on campus based on participation in the SAGE 2YC Faculty as Change Agents program?* Sub-questions included: 1) *What is the influence of multidisciplinary teams on CA perceptions of the PD?* 2) *What did the teams learn from hosting on-campus workshops?* The overarching question centered on the PL role is: *How did peer leaders perceive a change in their leadership due to their participation with the C3 program?* The inclusion of PL, who were prior participants in Cohort 1 and Cohort 2, provided an opportunity to also ask: *How did the PL further develop their leadership due to their participation in the program?* The analysis of data collected in the one-year program was also used to investigate the utility of the Theory of Change developed over the course of the SAGE 2YC project in this condensed delivery format. The evaluation is also responsive to the emergent COVID-19 situation that complicated the context of PD and includes a review of the CA perceptions of their experience and lessons learned during the year.

## 2. THE COHORT 3 FACULTY CHANGE AGENTS

The composition of C3 CAs and the institutional characteristics of their colleges helps ground the evaluation of the ways in which the CA experienced their year-long virtual PD. A total of 49 CAs on 17 teams began the program in January 2020, with 16 teams completing the program. One team of CAs took a short break from participating in workshops in Spring 2020 due to demands on their time from challenges related to COVID-19. This team reengaged in Summer 2020 and remained active until the end of the program in December 2020. Another team faced significant personal issues beginning in Summer 2020 and dropped out of the program, with two of the three teammates participating independently in a few fall PD sessions. A total of 45 CAs completed the full program. In C3, 14% of the starting 49 CAs self-identified as faculty of color.

This section addresses the following questions about CAs in cohort 3:

- How was the cohort selected?
- Who are the change agents/change agent teams?
- What experiences and expectations do they bring to the project?

### METHODS

This section reviews the application process used to select the C3 CAs and reports on results from a pre-program survey that probed motivations for applying to the project, what CAs hoped to learn individually and as a result of team participation, existing networks, and prior engagement in PD and professional associations. Additionally, participants took a leadership questionnaire (Bolman & Deal, 2013) to help them self-assess their preference in leading. This information was tapped during some of the PD sessions offered, and is not part of the current data analysis. Further analysis of this information will be done with the C3 CAs who opted to apply for the 2021 SAGE 2YC project.

### COHORT 3 CA FACULTY AND TEAMS

Cohort 3 was designed to increase access of the SAGE2YC program to a broader set of faculty. Building off the success of C1 PD approaches and the C2 virtual format, C3 funds included additional supports, such as peer leader mentoring and increased stipends. As recorded below, the C3 faculty and teams show diversity of participation in a number of measures, including geographic distribution, institution types, disciplines, and faculty role.

#### *Selection*

Unlike C1 and C2 that drew almost exclusively from the geosciences, the C3 application encouraged team members from a range of disciplines, requiring that one member be from the geosciences. Extensive posting on email lists to promote the application process helped expand participation in the program. A total of 28 teams applied and 18 teams were accepted; two of the accepted teams were from the same college and merged into one team for the project. Criteria for selection included the likely success of the proposed work, the potential impact of the work, and the overall

diversity of the CA teams with respect to disciplinary breadth. Institutional student diversity provided an additional factor taken into consideration in the selection process.

Of the 17 teams that began the program, 16 completed. The 16 teams and 45 CAs completing the C3 program represent the largest group of faculty participants since the inception of the program in 2015 (Table 2-1). All analyses below focused on the teams and CAs completing the entire 2020 SAGE 2YC program.

Table 2-1: Summary of team composition and distribution

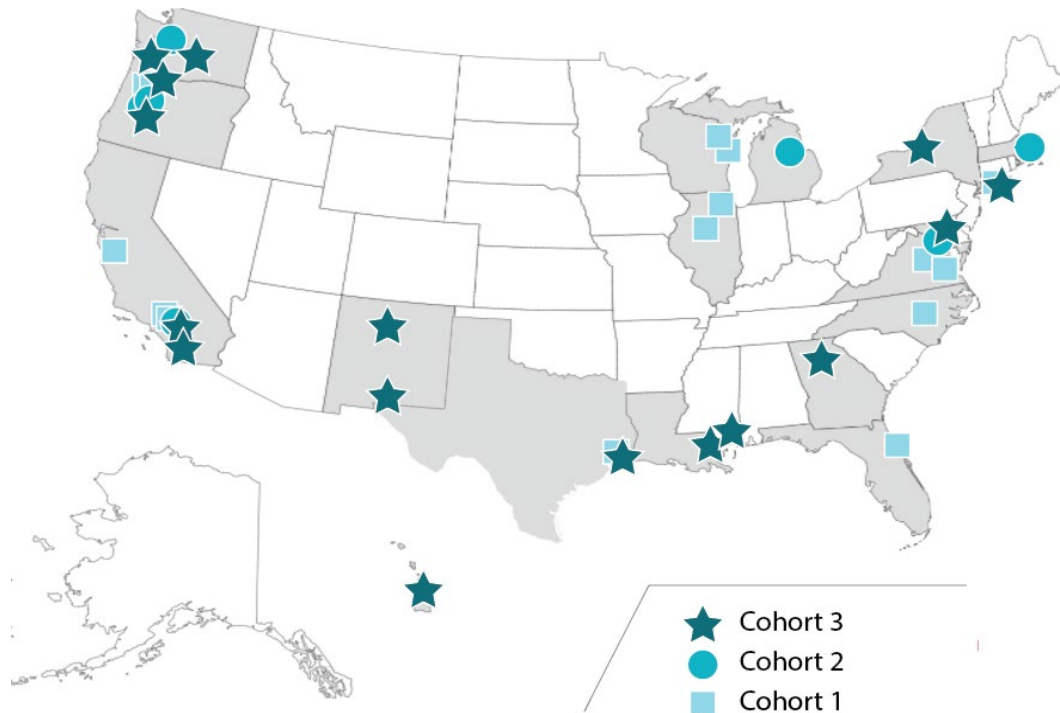
Cohort	Number of CA teams	Number of CAs	Number of 2YCs	Number of States
1	11	23	17	9
2	6	13	8	5
3	16	45	16	10
<b>TOTAL</b>	<b>33</b>	<b>81</b>	<b>40<sup>1</sup></b>	<b>17<sup>2</sup></b>

Note: <sup>1</sup>One 2YC has a faculty CA team in C1 and C2. <sup>2</sup>Six states have faculty CA teams in multiple cohorts

**Geographic distribution**

Figure 2-1 illustrates the location of the 16 C3 team (as represented by stars on the map). Two patterns are evident in this visualization of the various CA teams. First, the location of prior team participation in C1 and C2 helped seed interest among some of the C3 participating teams. Team clusters are evident in Southern California, Houston, Virginia/Maryland, Long Island, NY, and in the Washington State/Oregon corridor. Some prior C1 and C2 CAs actively recruited and promoted the SAGE 2YC project among peers in their institution and in their region. The second pattern that emerged was the participation of teams with no other prior exposure to C1 or C2 team activities. New teams participated in New Mexico, Louisiana, Georgia, upstate New York, and Hawaii. With the larger cohort size and virtual attendance, C3 had the broadest geographic reach (Figure 2-1 and Table 2-1).

Figure 2-1: Geographic distribution of SAGE cohorts



### Cross-disciplinary teams

As noted, a requirement in the application process for C3 participation was that at least one member be from the geosciences. Of the 16 teams, 11 were multi-disciplinary (69%). Teams ranged in size from two to five faculty per team, with most teams including two or three faculty members. As one team noted on their final poster presentation in December 2020: *Interdisciplinary collaboration would not have been possible outside of the SAGE environment, especially under social distancing conditions where personal interactions are unlikely to happen on campus.* The project provided support for multi-disciplinary teams to work together given the team nature of participation. In addition to the faculty from the geosciences (64%), other disciplines represented included astronomy, biology, chemistry, geography, mathematics, and physics (Table 2-2).

Table 2-2: C3 discipline distribution

Discipline	# C3 participants
Astronomy	1
Biology	5
Chemistry	3
Earth Science	29
Geography	2
Mathematics	1
Physics	4

## Adjunct Faculty

The SAGE 2YC program has highlighted the importance of adjunct faculty at community colleges, including resources and ideas to better support adjuncts (e.g. <https://serc.carleton.edu/218268>) and C1 and C2 CAs encouraged involvement of adjuncts at regional workshops. Cohort 3 saw a high level of adjunct faculty participating as CAs (21% of C3 CAs), suggesting that the format of the program supported participation of adjunct faculty. While the evaluation did not review the influence of the CA stipends on participation, it is hypothesized that providing stipends signaled to prospective applicants and ultimately to the CAs selected that their time was valuable, and that the stipend also provided recognition of the importance of 2YC faculty and adjunct faculty in creating pathways to success for students. Further evaluation would be needed to confirm if this connection was perceived by CAs as none noted the stipend amount as a motivation to participate. A review of the adjunct's motivation to participate in the SAGE 2YC program highlighted an interest in gaining teaching strategies and engaging with others in the profession. Like other CAs, some of the adjuncts had participated in programming offered by C1 and C2 CAs and wanted to become more involved. Moreover, one team consisted completely of adjuncts from three different programs (see [Lane Community College](#)).

## Institutional contexts

The institutions represented in Cohort 3 had a marked increase of minority-serving institutions. Table 2-3 highlights how each offering of the SAGE 2YC cohorts expanded Minority Serving Institution (MSI) involvement, with MSI C3 teams almost doubling the percentage of MSIs represented over the entire SAGE 2YC project. The majority of the CAs institutions were MSIs in C3 (56%). Of the 16 community colleges in C3, six are Hispanic-Serving Institutions (HSIs) one of which is also an Asian American, Native American, Pacific Islander Serving Institution (AANAPISI), one is an Alaska Native Serving or Native Hawaiian Serving Institution (ANNH), and two are Predominately Black Institutions (PBIs).

Table 2-3: Summary of Minority Serving Institutions (MSI's).

	Total 2YCs	MSIs <sup>1</sup>	% MSIs
<b>Cohort 1</b>	17	5	29%
<b>Cohort 2</b>	8	3	38%
<b>Cohort 3</b>	16	9	56%

<sup>1</sup>2020 data from the U.S. Department of Education Minority Serving Institutions (MSI) that receive or qualify for MSI funding: <https://www2.ed.gov/about/offices/list/ocr/edlite-minorityinst.html>

Institutional context influences what pressing needs face the CAs and how they are able to implement the new practices they learned. In addition to the increase in MSI participation, Cohort 3 institutions range in enrollment size (from 2,000 to over 55,000 students), student demographics and socioeconomic status (Table 2-4).



Table 2-4: Institutional enrollment IPEDS data

College	Fall 2019				
	Enrollment	Students awarded Pell Grants	Students of color <sup>1</sup>	Hispanic or Latinx students <sup>2</sup>	25 years or older
Anne Arundel Community College	12655	21%	27%	9%	33%
Central New Mexico Community College	23096	29%	14%	53%	38%
Centralia College	3077	25%	10%	12%	47%
Clark College	9233	25%	15%	12%	31%
Delgado Community College	14140	60%	58%	10%	52%
El Paso Community College	29080	41%	3%	84%	20%
Fletcher Technical Community College	2304	49%	31%	4%	34%
Georgia State University-Perimeter College	18573	45%	61%	13%	30%
Houston Community College	56151	34%	39%	37%	41%
Lane Community College	8861	32%	12%	14%	34%
Leeward Community College	6568	23%	74%	16%	33%
Monroe Community College	11572	51%	31%	11%	35%
San Diego Mesa College	20712	16%	29%	39%	34%
Santiago Canyon College	11911	14%	14%	53%	35%
Suffolk County Community College	25230	26%	14%	27%	18%
Yakima Valley College	4650	46%	8%	56%	34%

<sup>1</sup>Includes American Indian or Alaska Native, Black or African American, Asian, Native Hawaiian or Other Pacific Islander, and students of two or more races. <sup>2</sup>Hispanic/Latinx column is separated from Students of Color, as IPEDS does not collect race data for those students that identify as Hispanic or Latinx (personal communication with IPEDS Ed.gov employee). It is thus impossible to tell which Hispanic and Latinx students also identify as students of color or students of two or more races.

### THE C3 FACULTY CHANGE AGENTS AT THE BEGINNING OF THE PROJECT

At the beginning of the program, CAs filled out a pre-program survey covering motivations for participation, what CAs hoped to learn in the project, expectations of team portion of the program, and who they identified as part of their network. Further questions covered initiatives underway on campus, campus processes for assessing learning, leadership positions on campus, and leadership roles in national professional organizations.

## **Motivation**

On the pre-program survey, CA's indicated various motivations for applying to join Cohort 3, encompassed in five major themes, including: 1) aspects relating to the SAGE goals and program reputation, 2) desire to improve student success and broaden participation, 3) opportunity for professional development, 4) opportunities to collaborate with peers, and 5) encouragement by a colleague. The following quotes are examples of how CAs characterized these motivations.

### **Aspects relating to the SAGE goals and program reputation (includes prior experience)**

*I had participated in some workshops set up by another cohort... so I knew about the goals and structure of the program. The call for applications was timely for me, because I was looking to expand out from simply implementing ideas in my own classroom and was interested developing workshops for others, but that can be really challenging to do as an adjunct. I applied hoping for an opportunity to grow my skills in a new direction and be supported in taking on a new challenge.*

*I have been to 2-3 SAGE workshops at GSA and have been very excited to learn new things that I could put into practice right away. I feel like I have learned a lot about reaching out more to students and helping them to have the tools they need to succeed.*

### **Desire to improve student success and broaden participation**

*...I am currently ready to take on new and exciting ventures that can help my college above all. Most programs are geared towards fostering our individual success in the classroom, while the SAGE 2YC provides the potential to address needs not only of my college but of our entire region. I hope to have this type of impact through my participation in this project.*

*I want to make changes that matter in my teaching methods to help students become more successful in my courses.*

*Conversations with colleagues over many years that have included low enrollment concerns and low success rates primarily for certain diverse student populations.*

### **Opportunity for professional development**

*One of my colleagues told me about it. As someone who is very new to teaching, it is a priority for me to improve my practice to provide a good educational experience for my students.*

### **Opportunities to collaborate with peers**

*Working at a college with a small and relatively new group of faculty in geosciences, I was motivated to grow a network of other faculty in geoscience and STEM. Additionally, the opportunity to evaluate my current teaching techniques, learn and implement new techniques to improve student learning.*

*I was motivated to apply to the SAGE2YC project because I'm seeking ways to collaborate more closely with fellow geoscience instructors and because my goal of creating an interactive, on-campus field experience for students aligned well with the goals of SAGE2YC.*

### **Encouragement by a colleague**

*I applied to the SAGE2YC project due to the recommendation of our geology professor. She has been involved in other programs/projects and highly recommended this project.*

*I was approached by a faculty colleague from Geology to see if I had any interest in joining the program since our teaching subjects sometimes overlap and they had opened the Cohort 3 to other disciplines so I would qualify. It sounded like a good idea and would help us become organized.*

### **Aspirations**

When entering the project, the CAs expressed on the pre-program survey what they hoped to learn and take away from the project. CAs described a variety of outcomes and gains ranging from: improving their teaching practices and pedagogic toolkit, strategies to broaden participation in their programs, strategies to increase student success and pathways, opportunities to collaborate, development of leadership skills, and strategies to influence program level change.

#### **Improving teaching practices**

*I hope to gain more insights on how to implement practices in the geoscience classroom that will promote equity, diversity, and inclusion. In our on-campus project, we have not gotten a lot on practices to use in class, but more on the reasons we need to consider these issues for our students. I also hope to learn more about incorporating opportunities for Earth Science students with regards to experiential learning, which would allow us to take full advantage of the research labs/programs/governmental organizations in our local area as well as establish stronger connections with them.*

*Incorporating new pedagogical practices & engagement strategies, increase enrollment and success of underrepresented groups in the geosciences, and increase student exposure to career and educational opportunities in the geosciences*

*I want to become better versed in the current methods being discussed in the discipline. I want to be able to share what I learn with my colleagues. I want to have a "toolbox" of activities to use in my classrooms.*

#### **Broadening participation**

*I am hoping to broaden participation in my program for all students, but most especially for underrepresented groups. I think, thus far, geologists have been unsuccessful at attracting and retaining a diverse population in our discipline, and that hurts both those populations and holds back geology as a science.*

*I would like to learn ways in which I can improve our advising in our STEM courses. I also would like to learn ways in which I can make our geoscience courses more attractive to students, thereby increasing enrollment.*

#### **Supporting student success and pathways**

*Learn about and implement new teaching strategies that better promote the academic success of all students, especially those that are traditionally underrepresented in the Earth and Space Sciences.*

## **Leadership skills**

*Leadership in terms of professional development - how to structure workshops, increase participation, and provide others with ideas they will actually implement. Nucleate a stronger culture of innovation and active learning.*

## **Collaboration (on campus or with SAGE network)**

*...Tighter collaboration between different disciplines within my department...*

*First and foremost, I hope to learn from fellow project participants. More specifically, by hearing about what geoscience instructors are doing at other schools, I hope to expand my thinking about what's possible to do at my own institution.*

*I also look forward to meeting people for the purpose of future collaboration on other projects, including grants, field trips, etc.*

## **Program level change**

*I hope to (1) learn effective teaching strategies and (2) develop and implement an action plan to improve the earth sciences "program" at my institution.*

## **Prior leadership**

Cohort 3 CAs entered the program with a variety of campus and national leadership experiences. Of the 42 respondents, 62% held formal or informal leadership positions on campuses at the start of the project, including 26% acting as department chairs or assistant chairs, 42% are chairs of committees, 19% advise student groups, and 38% do not currently hold formal or informal leadership positions. At the national level, 38% of respondents described a current or past state or disciplinary society leadership role. Unsurprisingly, the vast majority of CAs identified department/program colleagues as the individuals (n=33) and other campus members (n=34) in their network. About one-third of the CAs also identified administrators as part of their network (n=15).

## **Campus Initiatives and Assessment**

CA awareness of institutional initiatives can support how they leverage the requests they have to leaders when team efforts align with institutional objectives. Two major campus initiatives were identified by the CAs. Guided Pathways were identified by half of the CAs (n=24) as an initiative underway, and another 20 CAs referenced institutional strategic plans or program reviews. Attention to student assessment occurred most often due to college level assessment programs (n=27), with 10 of the CAs also noting the assessment they do on their own in their classes. Tied to this assessment was attention to institutional effectiveness. Like assessment, most attention to effectiveness occurred at the college level in offices of institutional effectiveness (n=25), with 13 CAs not sure how assessing effectiveness was conducted on campus.

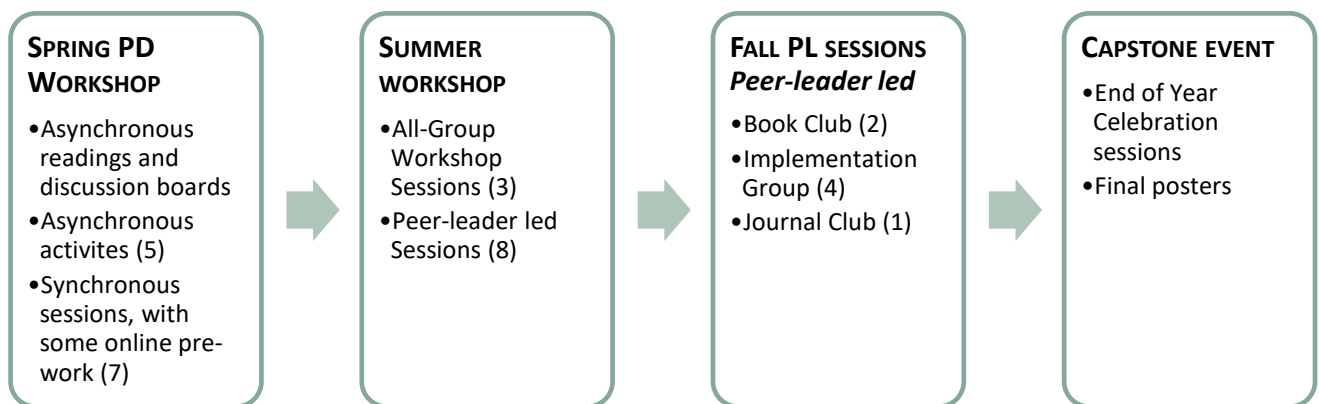
### 3. THE COHORT 3 VIRTUAL PD EXPERIENCE

The prompts guiding this section include:

- What was the structure of the Virtual PD Model?
  - How did CAs assess their PD experiences?
  - What features of the PD model resonated with CAs?

Elements of the program format replicated prior SAGE 2YC programming, with differences including the move to a totally virtual PD experience (C2 included a culminating in-person workshop) in a compressed format and the addition of PLs who conducted workshops, consultations, and provided ongoing feedback to the CAs. This section reviews the key activities involved in the spring PD program, in the summer workshop, and in the fall PD sessions. Figure 3-1 outlines the workflow for the year. A final virtual meeting of C3 occurred in December 2020 as an end of project celebration. This final session involved CA teams presenting the outcomes of their team action plans and the individual CA noting what they accomplished. Part of this activity involved CAs commenting on other team presentations in advance of the synchronous time together.

Figure 3-1: PD overview



#### METHODS

End-of-Session (EOS) evaluations were collected at the conclusion of each individual workshop, as well as evaluations at each program transition point (e.g., end-of-spring, summer workshop, end-of-the year). The EOS included numeric assessments of these sessions, and short-answer prompts asked what the participants found most valuable in the session and how they would apply what they learned in their teaching and in their program or department. CAs completed pre- and post-project surveys to help assess change over time. The teams also submitted a summary report after they concluded their campus workshops, all of which were virtual, which reflected on what went well, what they would do differently the next time, what they felt the impact was for participants, and what they learned that they will apply in their future work. Finally, the teams presented a summary final poster of their year-long work in the program in a capstone event in December 2020.

## Virtual Professional Development Model

The virtual delivery of the PD included both asynchronous and synchronous delivery of material. Asynchronously delivered readings, videos, and discussion boards provided faculty participants with research-based strategies and opportunities to share insights, questions, and examples; synchronous sessions engaged participants in various group configurations to discuss what they were learning with other participants.

Active learning was infused in the synchronous sessions using a variety of evidence-based strategies to help CA support student success, broaden participation, and build career pathways. Sessions offered in the Spring PD program (Figure 3-2) addressed tools for institutional change, a webinar on the use of course-level data to identify opportunities to serve students better, and strategies for designing and leading workshops. Additionally, teams worked on action plans for change in their classrooms and on campus. The project leaders also met individually with teams to provide feedback.

Additional coaching support was provided by the PLs, with 13 participants from earlier cohorts serving in these roles. The PLs conducted consultations with CAs, led sessions in the summer workshop, and led fall virtual activities. Teams presented workshops on their home campus in fall 2020, with some completing these workshops in early spring 2021 given scheduling due to COVID-19.

The PD structure provided multiple opportunities for discussion and sharing of participants' experience and expertise, and the teamwork on their action plan and the campus workshops they led in the fall provided opportunities for community building around shared issues. Advanced work through asynchronous work and engagement with team members on action plans provided multiple occasions to engage with the new materials CAs were learning. Discussion boards provided an opportunity to exchange ideas with other CAs, PL, and project leaders prior to synchronous sessions. The synchronous sessions also allowed for breakout rooms in which the CAs could discuss their thinking about the new materials they were just learning. The project leaders modeled the type of teaching strategies that the CAs were learning (e.g., active learning strategies, working with course-level data). Likewise, the PLs also modeled a range of effective teaching strategies when they led sessions.

Figure 3-2: Cohort 3 Workshop Program Spring 2020 (<https://serc.carleton.edu/235288>)

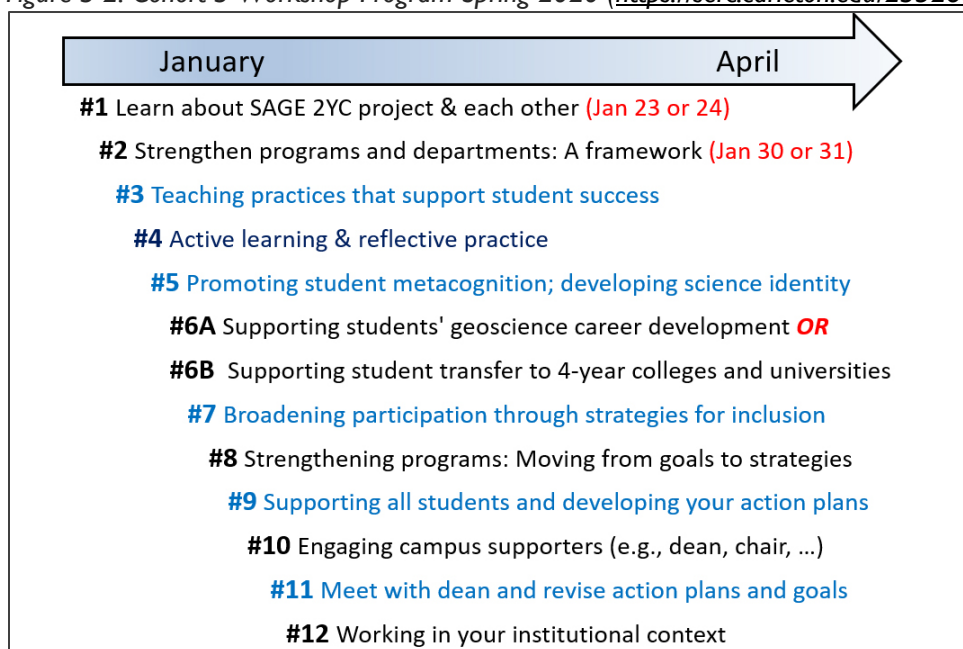


Table 3-1: Cohort 3 Workshop Program Summer 2020 (<https://serc.carleton.edu/237014>)

Session Type	Duration	Description
Team Presentations	2 hours	Each team will give a ~10-15 minute presentation on their outcomes data and action plan followed by discussion with the other teams in that session and project leaders.
Developing students' sense of belonging session & Working with your colleagues and administrators	4 hours	Strategies for leading change session (SB+L): Two topical sessions, each with some pre-session asynchronous work.
Campus workshop sessions	6-8 hours	Two days in sequence focused on designing effective workshops, designing your campus workshops for the fall and strategies for engaging your campus community. Includes work time.
Menus of choices	1-1.5 hours	Each Change Agent will select one 1-1.5 hour session from a menu of choices. The sessions will be led by peer leaders on a variety of topics related to project strands offered at various times during the workshop. Later this spring, we will distribute the schedule. If interested, you can participate in more than one session.

Table 3-2: Cohort 3 Workshop Program Fall 2020 (<https://serc.carleton.edu/239099>)

Fall PL Session Focus	Mode
Broadening Participation in STEM	Evidence-based solutions - journal club
Conducting research with 2YC students	Implementation group
Developing STEM Scientist Spotlights	Implementation group
Implementing Active Learning Strategies in Your [Online] Courses	Implementation group
Integrating Environmental Justice into your [Online] Course	Implementation group
Small Teaching Online (Flower Darby with James Lang)	Book club
Teach Students How to Learn: Strategies You Can Incorporate Into Any Course to Improve Student Metacognition, Study Skills, and Motivation (Saundra McGuire)	Book club

### CA perceptions of the Virtual PD Model

The onset of campus closures during the middle of the spring 2020 spring activities due to the COVID-19 pandemic resulted in substantial changes to the work life of CAs, PLs, and project staff, yet only minor changes occurred regarding timeline adjustments to offerings with a gap in programming of one week. By pushing back some due dates and offerings of sessions, there was some relief during the time when most in higher education were reacting to the sudden pivot to online/hybrid transitions for courses.

The following figures highlight the overall satisfaction of spring and summer workshops (Figure 3-3), the value of different forms of program delivery and particular topics (Figure 3-4). The CAs indicated high levels of satisfaction overall with the program, with all CAs finding value in the synchronous delivery of the programming. Value of levels of forms of engagement on CAs' learning were particularly high for those activities that were centered on immediate application of learning—to the CAs' classrooms (95%), to their work with their team (90%), and with delivery of their on-campus workshops (90%). Less value was perceived regarding learning more about the project strands (61%) and learning about leadership (61%). Similarly, CAs perceived more high value in activities close to their day-to-day work—to supporting their program/department goals (93%) and expansion of their professional network (83%). Whereas they perceived less value regarding leadership elements of their work—acquired more leadership responsibilities since the start of the program (46%) and viewed on campus as a person with expertise to share (29%).



Figure 3-3: Workshop satisfaction ratings

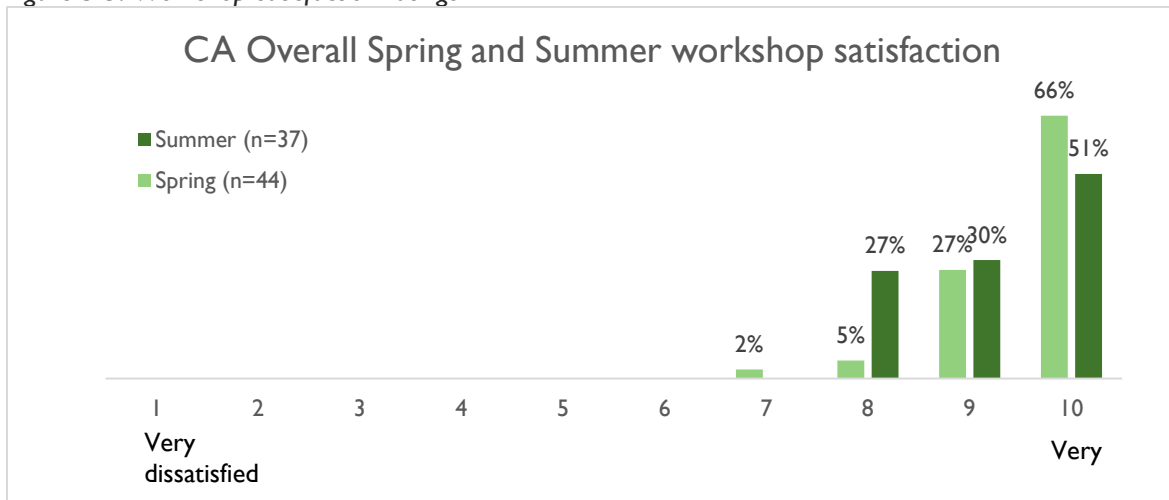
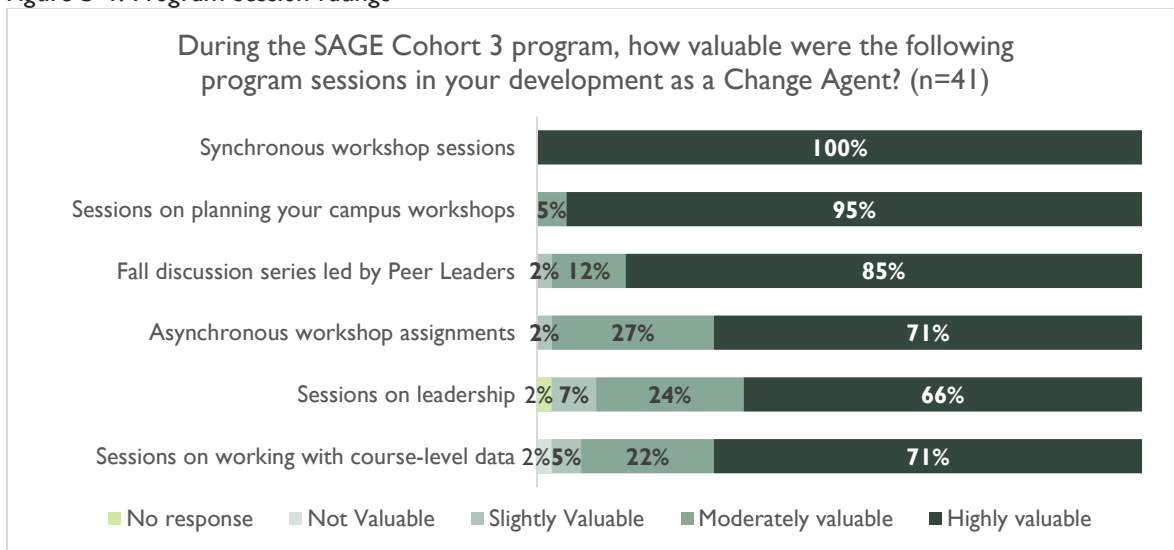


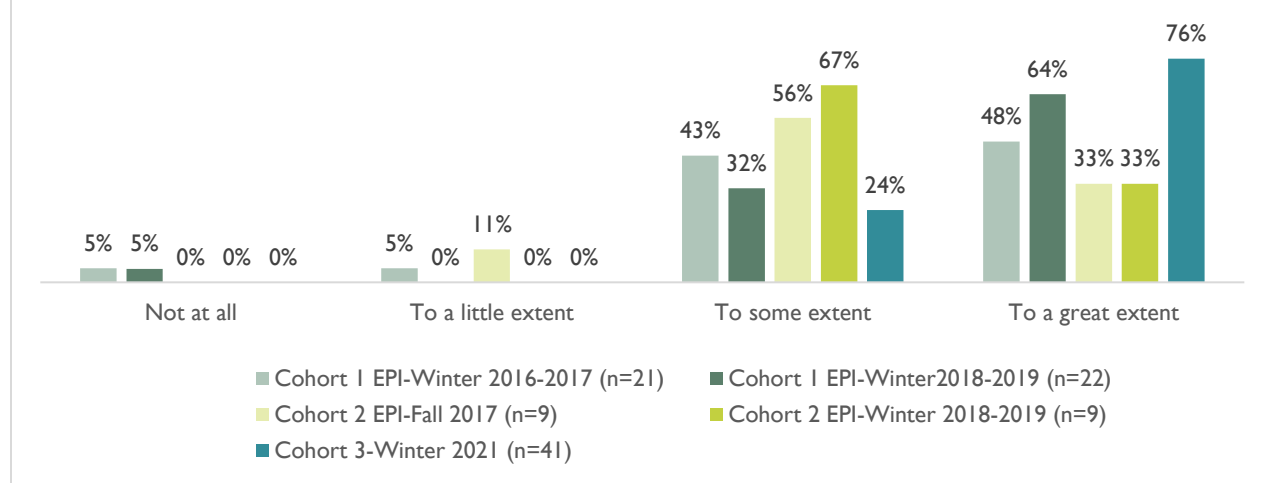
Figure 3-4: Program session ratings



Building a network among faculty colleagues throughout the country has been part of the SAGE 2YC project since its inception. Figure 3-5 below highlights the CAs perception of the extent of this community for the three cohorts involved in the project. Notably, C3, which was the largest cohort, felt they had built a community with the group to a great extent (76%; n=41). Members of C1 indicated that their sense of belonging to a community also occurred to a great extent (64%; n=22), and this measure occurred after two years of being with their cohort. This high level of community and the corresponding high satisfaction with the synchronous meetings show that CAs in C3 received great value in meeting together and discussing their new learning and issues on campus in their times together in the synchronous meetings.

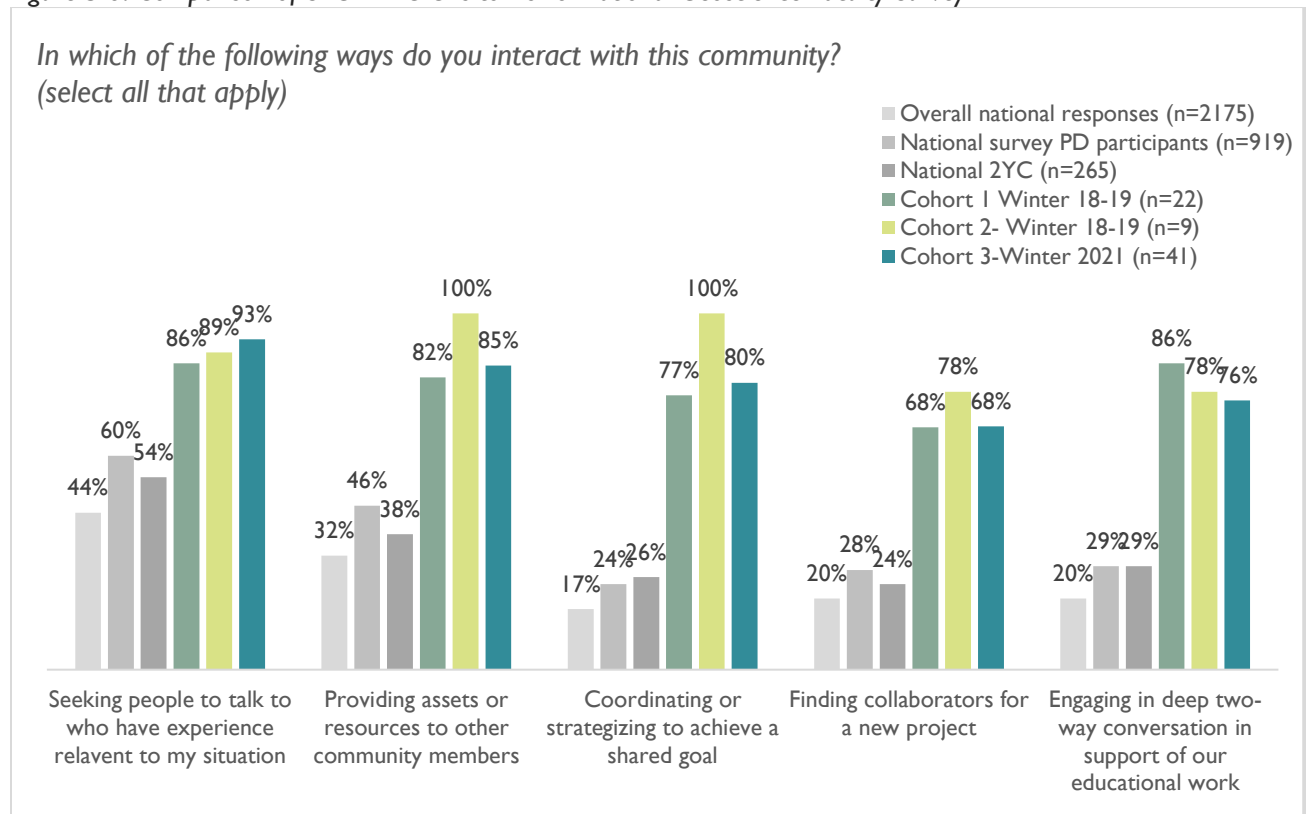
Figure 3-5: Cohort 1, 2, and 3 Faculty CA Responses to Community of Practice Questions

To what extent do you consider yourself part of a community of STEM educators ["geoscience educators": C1/C2] that shares your goals, philosophy, and values for geoscience education?



When asked about the ways they interacted within their STEM community, the CAs in C3 indicated they sought out people to talk to who had relevant experience relevant to their situation at a level higher than the prior to cohorts (C3=93%, n=41; C2=89%, n=9; C1=86%, n=22) and higher than those faculty participating in a national survey. Because C3 experienced the pivot to remote and online learning during the time they were doing the spring sessions, they were able to talk with others about their experiences and to share information within the group about strategies to manage the shift and to support students. Because the group had been familiar with Zoom due to their virtual PD, they were familiar with engaging in learning online and in both synchronous and asynchronous formats. Simultaneously, due to the closure of many campuses, the CAs faced limitations in other forms of engagement within their community of educators. Even with these barriers in place, C3 participants responded at higher levels of engagement with others in their educator community relative to the national survey.

Figure 3-6: Comparison of SAGE 2YC CAs to 2016 National Geoscience Faculty Survey



### Influence of COVID on Virtual PD

The final spring 2020 survey to CA included a question that asked: *Has your participation in the SAGE 2YC project helped you address challenges related to COVID-19? If so, please explain.*

The vast majority of the CAs indicated that their participation in SAGE 2YC helped them pivot to remote learning, and they appreciated the leaders modeling online teaching practices including methods to engage students in virtual learning. A few noted, however, that their past experience teaching online meant they were already familiar with working with students in a remote manner. Others commented that the general sense of being overwhelmed made it more difficult for them to fully engage, and they thought they would more fully access the SAGE 2YC resources in the future. *(It has been really hard to focus on SAGE for the past month or so though as we've made the transition to online learning. I am sure more things from SAGE will be relevant to COVID-19 challenges once I have a chance to breathe and think about it more.)*

### Helped identify challenges via the three project strands

*We are more aware that students who are thrown into online learning may have different experiences when considering faculty are not trained online for one, but also they may not be aware socioeconomic status may interfere with a student's ability to take online classes or also students with disabilities may need certain modes of content delivery that did not need to be addressed in the face to face environment.*

*I added a science identity activity to my online class and hope to incorporate more (we are in week 2 of our 8 week spring term).*

*Thinking about active learning and how to provide dynamic, engaging instruction is even more relevant and challenging given the unexpected switch to online learning, so the program helped with that in a very general way.*

*I do have the luxury of having only one class, but it is a new prep for me, so it has been a lot of work to put online in a way I am proud of. However, I am glad that I had the tools from SAGE to understand the essence of student engagement. I can stand by the quality of this course even in non-COVID circumstances, and the deep engagement we had with learning strategies and metacognition informed my design.*

### **Structure of Virtual PD**

*Yes, and vice-versa. I already teach online a lot, so I feel like it is very helpful that those with whom I work have had more opportunity to experience the challenges of taking our coursework online. Part of our action plan involves improving an online template, so I think that will be even better received now.*

*YES! Synchronous and asynchronous were not even a part of my vocabulary. They are now, and were very helpful in my transition to online education.*

### **Familiarity with Zoom**

*Yes. It required me to become familiar with Zoom before I needed it!*

*Yes -- seeing the use of extra tools within the online environment helped in near future classes with the restrictions caused by the pandemic.*

*Yes, it has. Now everything has moved online, being able to communicate via Zoom or another video platform has enabled a clear line of communication between students and the instructor.*

*YES! This project helped me learn all the features of Zoom that I could use in my classes. I was also able to discuss ideas for moving things online and still recruiting new students and retaining our current students asynchronously.*

*Yes in the sense that once I showed up to the Zoom meetings, they were well run and on-task. I'm much more comfortable with Zoom as a result of this project, and this has really helped as I've had to lead Zoom meetings myself.*

*Using Zoom helped me with meetings at my college. I appreciated that several cohort members and leaders shared their ideas.*

*Yes, meeting online on Zoom had opened me up to a platform that I am now using every single day.*

*Yes, it has built my confidence in attending virtual meetings and given me the experience to execute virtual meetings myself.*

*Yes, most definitely! Especially, being introduced to Zoom platform early on (before the outbreak), it was a great advantage for me to be ready to switch to remote teaching.*

*Yes. Although I had already used Zoom I feel that I am a bit better at using this tool.*

*Yes. It helped me become familiar with Zoom and synchronous and asynchronous activities. I used these skills and confidence when I had to switch all my classes online in two short weeks.*

*It has made me comfortable with zoom. Before this project, I had never even heard of zoom and now of course it's a household word (in my house!).*

*I am already experienced in online learning but the zoom meetings and teams helped me see it from the student's perspective.*

*Yes! Learning the different teaching methods was perfect to deploy in my new online setting. It gave the students something unique to experience when they felt like they were being taken out of an environment they wanted. Plus, with so much exposure to zoom in this project, it gave me a head start in using it for my students!*

*Yes, without being part of this program I would not have thought of conducting my classes via zoom. My students were so appreciative as it made their forced" transition from f2f education to remote education very smooth. My students were able to succeed this semester because of this. Thank you!!!*

## **Community Support**

*So much! When all this went down I almost didn't have the mental capacity to continue with this, but it instead gave me some hope to have something to look forward to for fall. A goal. I think we are all relying on something to look forward too and this helped me with that. It also allowed me to see how easy zoom is!*

*The obvious help I'm aware of is seeing my colleagues at the synchronous meetings that are coping, and maintaining their cheerfulness. I simply haven't had the time in my schedule to read the emails that have been sent out which are specifically about the pandemic. I've found that for own mental health, I have to limit how much of the news, discussion, etc. I take in about it.*

*The added challenge of getting courses online only slightly hindered my participation in the workshop. There were a one time that couldn't participate in the synchronous activities. It was still a welcome event and something good to look forward to working on each week.*

*It was nice feeling a sense of community in the midst of this otherwise isolating time.*

*Being able to interact remotely with other people hugely helped my confidence in running remote classes.*

*The workshop did let me see I was not alone in the challenges I was facing due to COVID-19.*

*Yes, especially some of the supportive comments and suggestions by other members.*

*I have felt better connected to the 2yc and Geoscience community, and was more easily able to transition to online courses because of the support and resources of the*

*SAGE 2yc community.*

*Thinking about teaching effectively and fairly, discussing it with like-minded colleagues put me in a more mindful space that helped me handle the abrupt transition to online classes. I had never taught online before, but I think the resources for SAGE 2YC as well as the fact that I had been thinking intentionally about my teaching really helped me make that transition from face to face to delivering my course online.*

*More importantly, it provided a bright spot of communication with others and a chance to focus on a "normal" task/goal that I had willingly signed up for, which was very much appreciated.*

*Generally, participating the program was a bright spot of structure and fulfilling work during a time when both of those things were in short supply.*

### **Overloaded and stressed**

*Actually, it's put some extra strain on. Having to move everything online with basically no lead time, while also running full steam ahead with this was pretty daunting. For an organization that is focused on helping 2YC instructors become the best that they can be, it seemed pretty surprising to have no acknowledgement that we needed a moment to pause and focus on the teaching and students, not prepare a major plan on how to improve the department. I just kind of feel like we were treading water and struggling to stay afloat, and SAGE was like "while you're doing that, please submit your designs for a new and improved boat that you can use in the future if you ever get to shore."*

*I imagine as I prepare for Fall Quarter online, I will implement changes. This quarter has been extremely difficult as we were given two weeks to prepare our courses to be taught online and are still only half-way through the quarter.*

### **Valuable Features of the PD Model**

The CAs found high value in the synchronous sessions, in particular with the breakout rooms as this feature gave them time to discuss with others the new information they were acquiring. Likewise, the smaller group discussions provided them a means to share information occurring on their campus and from their past experiences to offer suggestions to others and to swap ways of dealing with challenges. The modeling by the project leaders and peer leaders during the project helped show CAs ways they could employ similar approaches when they conducted their own campus based workshops and provided them with examples of using active learning in a virtual environment. Because the CAs worked in teams to conduct their campus workshops, they had a built in network on their campus to host their own virtual PD sessions. For some, this team also provided them a mechanism to connect with others on campus in ways they had not in the past.

## **4. WHAT AND HOW DID C3 CHANGE AGENTS CHANGE**

The questions this section addresses are:

- What changes in terms of practices and associated attitudes/efficacy surrounding those practices do CAs make in their teaching and courses, programs, and institutions over the time of the SAGE 2YC grant?
- How do CAs attribute and report these adjustments in relation to the SAGE 2YC program?

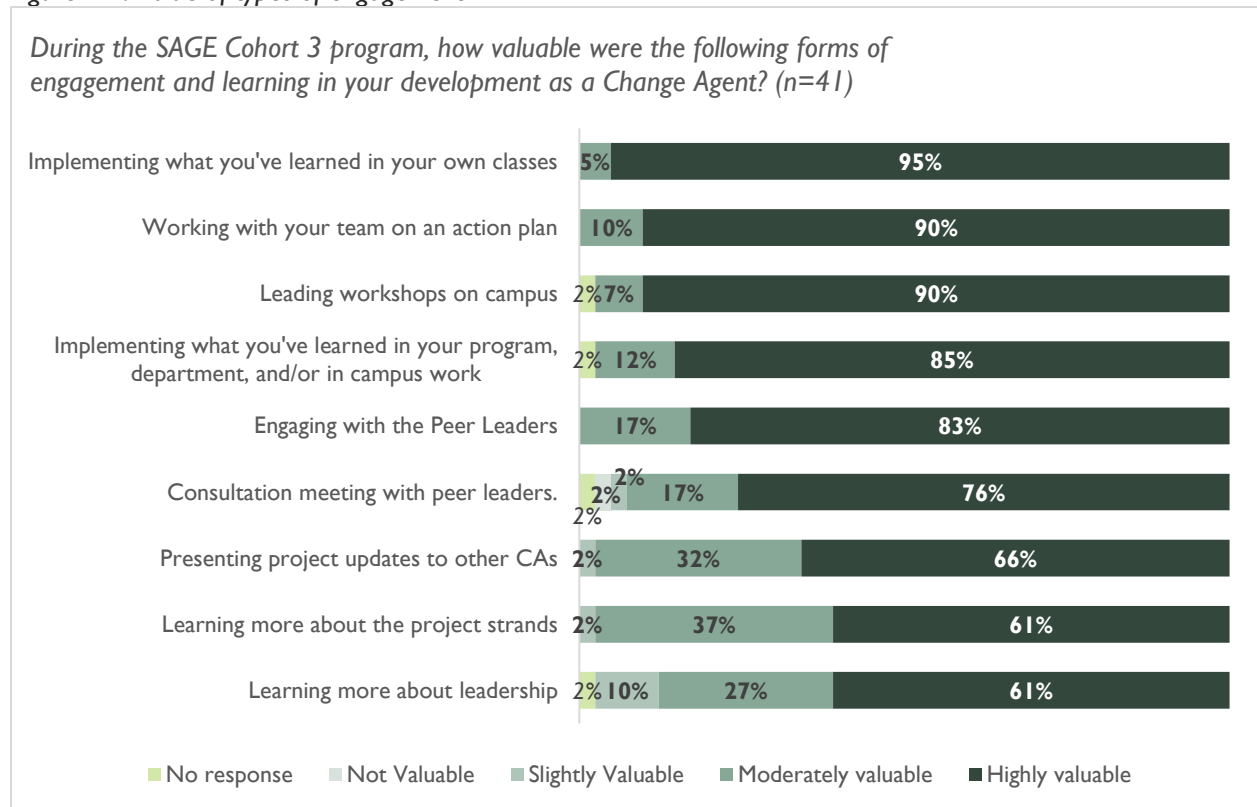
## **METHODS**

A capstone poster was completed by each team, covering individual accomplishments, team accomplishments for strengthening their programs/departments, identification of partners, and next steps for team actions and to develop campus community. The poster prompts also asked CAs to describe leading as agents of change, how COVID-19 influenced their experiences, and asked for reflections on the role of the PLs. Additionally, survey data were collected at the end of the spring sessions, after the summer workshops, and at the end of the program in December 2020.

## **CHANGES TO PRACTICE**

At the end of the year-long PD, CAs were asked to reflect on what elements of the program best supported their learning, where nearly all responses indicated that all aspects were slightly to highly valuable (Figure 4-1). The elements that rise to the top as most highly valuable are those with direct application, including implementation of learning and engaging with colleagues. This includes applying what they learned into their own classroom practice (95% rated highly valuable), working with their teams and PLs (90% rated highly valuable), and leading campus workshops (90% rated as highly valuable). The high ratings of these aspects of the project highlight that while learning about teaching practices and leadership is important, building in opportunities to practice, as well as opportunities engage with colleagues is critical to change (see Theory of Change in section 8 for more about how SAGE 2YC builds in these opportunities).

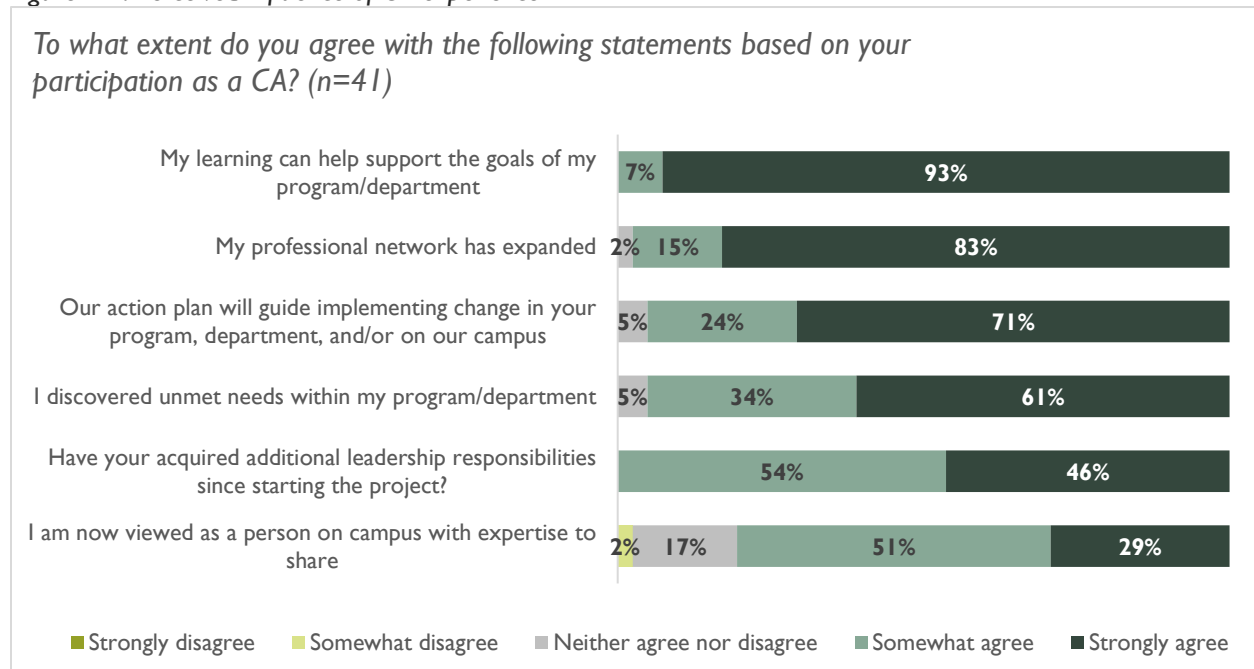
**Figure 4-1: Value of types of engagement**



The final survey of CAs asked how participation in the program helped support program/department goals and the CAs leadership on campus. Overwhelmingly, the CAs saw how their learning helped them support their programs (93%), and expand their professional network (83%; see also information above on the Community of Practice). Given the short one-year timeframe for the project, it is not surprising to see less identification of new leadership positions on campus by the CAs (46%) or that their expertise is widely seen on campus (29%). Leading of PD on campus as part of the project provided the CAs with a chance to practice leading and sharing their new learning with others.



Figure 4-2: Perceived influence of CA experience



### Individual Level Change

A prompt for the CAs in their final presentations was: *What have you changed and what are you doing differently in your teaching/work?* Responses to this prompt focused on items directly related to the CAs work in the classroom and connections were clearly linked to programming the CAs received in SAGE 2YC. Table 4-1 below summarizes the types of changes to their teaching practices the 45 CAs attributed to their participation.

Evident in this analysis are direct application of new learning for the CAs to their classroom teaching, with several active learning strategies being applied. This type of direct application also occurred with metacognition and use of Bloom’s in CA classrooms. Work with Scientist Spotlights occurred in the CAs providing scientist spotlights in their lectures *and* in assignments in which students had to research and present on a scientist. Just as the CAs noted the value of community for them in the project, they in turned shared their new expertise with others on campus and within the SAGE 2YC project. Attention to broadening participation translated in several ways. As noted, scientist spotlights were a popular application of new learning, and attention to building a sense of belonging also fostered inclusive teaching practices. Looking at course-level data helped identify gaps and trends regarding the student progress.

Table 4-1: Reported changes in teaching practices

Action	Number of CAs Implementing
Active Learning (e.g., think-pair-share, exam wrappers)	29
Shared information with others/built community	15
Presented Scientist Spotlights	14
Metacognition	10
Scientist Spotlight Assignment	9
Sense of Belonging/DEI incorporation	8
Career Pathways/Promote staying in STEM	6
Incorporated Bloom’s Taxonomy	5
Context-based Teaching/Connect to Real Life	5
Data Analysis on Student Progress	4
Environmental Social Justice/Course Design	4
Post Campus Resources	2
Student Research	1
Leadership	1

## SUPPORT DURING COVID-19

The final poster presentation provided an opportunity for CAs to reflect on their work during COVID-19. This information, combined with the CAs responses to two prompts from the final survey provided information on the ways in which they found the SAGE 2YC program supportive during the pandemic. The prompts from the final survey were: 1) Please identify one to two key take-aways you have from your participation as a Change Agent, and 2) What best supported your learning in the project?

Three areas were identified that helped support learning during the program. First, the structure and delivery of the PD was noted as providing predictability for the CAs. Second, working with peers in similar situations helped provide for resource sharing, and hearing from PLs what worked for them provided modeling. Third, the CAs noted how developing a national network with other CAs supported their work (see Figures 3-3 and 3-4 above).

### ***Influence of SAGE 2YC Program Structure***

The structure of the virtual PD provided a sense of predictability for the CAs. The goals of the sessions, the CAs responsibilities, and required deliverables provided a roadmap for the CAs during the program. Over 70% of the participants commented on how the content, structure, and resources of the program contributed to their learning. The content areas noted as especially helpful included active learning strategies, metacognition, sense of belonging and inclusive teaching practices, course-level data analysis, and science identity, all of which were relevant to their teaching in their setting. As one participant reflected, *“I feel I’ve gained a much more detailed understanding of what effective teaching looks like.”* The ability to apply lessons learned in the

sessions immediately to their classroom teaching was especially helpful during the move to remote and online learning. One CA stated that the program helped build “a geoscience teaching toolbox to rely on during COVID-19 times.” Specific focus on strategies to improve teaching practices were noted as a benefit of the structure of the program. As one team summarized at the end of the program:

*The most valuable part of the program was the format. The content matter was great and necessary, but having the meetings and assignments supported an environment that was more than just about information. Actually, working through the learning activities and consulting with colleagues helped to reinforce the information and provide a great starting point needed to incorporate into the classroom.*

When asked what helped support learning best in the program, a participant offered, “Clear guidelines of what was expected and a welcoming community to share ideas with.” Another added, “The leaders always kept us on track before, during, and after meetings.” The synchronous sessions used breakout rooms to support discussion among peers and provided a space to test-drive new thinking. As one participant indicated what best supported their learning, “Breakout sessions! These provided effective brainstorming on a focused topic.” Feedback from other CAs helped inform thinking about how to apply the strategies during the move to remote and online learning.

The fact that the PD occurred over an entire year provided more opportunities for engagement and reflection, as one team commented, “The usual conference or workshop does not allow for the same deep, long-term connections that have been made through this program.” The year-long structure of the program helped reinforce concepts, and gave CAs a chance to come back to the group after trying a new strategy and to discuss with others.

### ***Influence of Context***

Drawing CAs from the range of STEM disciplines provided a sense of shared experiences in a community college setting. The targeted nature of the PD built in opportunities for CAs to share experiences and strategies that are more specific to their work and use their emerging knowledge to apply to their own teaching. This authentic application of what they learned through their participation in the PD helped them respond to their campus needs and reinforced what they just learned. For example, one team linked to campus needs in the following manner:

*We recognized that our campus is currently reworking assessment as a mandate from an accreditation visit. We leveraged that knowledge to help us get our course level data, and will actually be sharing our results from that data mining to help the administration in its assessment work.*

The emergence of the COVID-19 pandemic dramatically affected the context of the work of the participating faculty and highlighted how some of the structural elements of the program had a heightened role. As one participant summarized, “The SAGE 2YCs use of the Zoom format enabled familiarity and short learning curve for employing a zoom synchronous teaching format in March 2020.” Having familiarity with Zoom prior to the pivot to remote teaching gave the participants more experience than many of their peers, and many were able to act as a resource for others on

campus. One team added, *“The pandemic brought our classes online either synchronously or asynchronously. We looked forward to participating in the SAGE 2YC workshops because we could apply what we learned immediately in our classes.”* The move to remote teaching affected students, and faculty sought out resources to help support them. As one team commented *“The switch to online learning was coincident with our observation of dramatically lower success rates (for all students) in online classes. Knowing this really heightened the need to reach out to other faculty and provide easy-to-implement resources.”* Learning strategies to support student success assumed amplified importance during the pandemic. Faculty participating in the project were also able to be a resource for their colleagues on campus, and could implement strategies to help support their students.

Beyond the advantage of having a head start on the use of technology, substantive outcomes occurred. One team summarized:

*2020 was a year of great turbulence and an awakening to the huge racial and ethnic inequalities that exist in our country and around the world. The timing was really ripe for our work on inclusion, equity, and advancement of STEM concepts.*

In addition to this outcome for the team, they also encountered changes on their campus that the project prepared them to address: *“This summer the STEM unit merged with another unit and got a new dean. This project prepared us to better communicate with our new dean, and to stand out a bit as team players in our new unit.”* The PD helped prepare the CAs to deal with these changes, specific to their context, is important.

The program requirement for the participating teams to conduct on-campus workshops emerged differently than anticipated due to the pandemic. All final workshops led by participants were in a virtual format; participants offered positive feedback on this process:

*“Having virtual workshops allowed us to recruit participants from other departments on campus.”*

*“Presenting our workshops virtually allowed us to demonstrate active learning strategies (e.g. via Zoom) that our participants can implement in their own online classrooms.”*

*“The pandemic actually helped us to get participants from the other two campuses who we may not have seen if they were required to drive the 45 minutes to our campus.”*

*“We were able to make our workshops timely and relevant by focusing them on student success in online classrooms specifically.”*

The diffusion of new teaching strategies to colleagues on campus, either informally or through the PD workshops led by participants for their campus, expanded the reach of the program. The virtual format of the PD led to an easier transition for the participating teams to conduct their workshops virtually.

### ***Influence of Community and Emerging Networks***

The delivery of the SAGE 2YC program during the COVID-19 pandemic helped provide a built-in network for the CAs that was stable over the entire 2020 year. When participants were asked to provide one or two key takeaways at the end of the project, 40% identified the formation of a nationwide network and community they can access. For example, one faculty member reflected, *“We learned a lot from each other about how to approach our mainly common needs.”* Faculty built networks with others in the cohort from around the country. As well, they enhanced the relationships they had with their colleagues on campus. One team reported, *“As some of us were new to [the college], this experience allowed us to get to know each other’s strengths and weaknesses and build a strong foundation as a team.”* Another team commented on crossing disciplinary boundaries and the meeting restrictions in place due to COVID-19: *“Interdisciplinary collaboration would not have been possible outside of the SAGE environment, especially under social distancing conditions where personal interactions are unlikely to happen on campus.”* A faculty who was new to their position added, *“I think one of my big takeaways from SAGE was that other educators are dealing with many of the same problems. It’s easy to sit at my computer and feel frustrated or that I am doing something wrong, especially when we are all siloed away in our own homes during the pandemic.”* The built-in networking in the program provided participants a way to hear from other faculty across the country, which helped calibrate issues on campus that are common to participants at different colleges. Community building also occurred within the teams, in particular when faculty had the opportunity to work with others that they had not in the past.

Networking provided a means of connection during the lock-down period of COVID-19. As one participant reflected, the program *“Provided a support system to talk about shortcomings/best practices. It is a lot easier to make a change when you know it will be successful because others have gone before you.”* The network built during the program can sustain beyond the end of the program. This potential for sustained collaboration was noted by one participant who offered that the SAGE 2YC program *“enabled opportunities for networking with other STEM educators . . . which in turn will provide me a network of collaborators for future endeavors.”* Having a feeling of connection, especially during the shift to remote learning during the pandemic, helped support the participants.

The mix of small group meetings in the program provided opportunities for exchange of ideas with participants from different colleges. These groups discussed strategies they were learning, planned how to try the new strategies in their own teaching and on campus, and set up exchanges to learn how other programs and departments dealt with some of the shared challenges all the CAs faced. These built-in interactions provided the basis for expanding the learning community in STEM beyond a single college and helped counteract the isolation felt by many community college faculty. This learning community was especially important during the COVID-19 pandemic.

## 5. LEADERSHIP DEVELOPMENT—CHANGE AGENTS

An element of the PD was a focus on leadership development. The type of leadership development experienced differed in part by role, as the PL had several years of prior exposure to workshops and development opportunities (C1-four years, and C2-two years). Details on leadership development for the PL is found in Section 4, and this section focuses on the leadership development of the CAs.

The questions this section addresses are:

- How do the CAs define effective leadership?
- How do CAs see themselves as leaders?

### METHODS

The summer workshop registration form asked the CA *What are the attributes of effective leadership?* Knowing how the CAs define effective leadership informs how they begin to construct their views of their own leadership. A total of 35 CA responded to this prompt. A final survey of CAs asked about the value they received in the leadership workshops and the extent to which they felt they were viewed as a person on campus with expertise to share, and asked if the CAs had acquired any additional leadership responsibilities. The final team presentation in December 2020 included the prompt *How did the program support your ability to catalyze change in your setting (e.g., knowing more about Bolman and Deal leadership styles, the value of alignment with institutional initiatives?).*

### EFFECTIVE LEADERSHIP

When asked to define effective leadership, the following common attributes emerged. These definitions by CAs likely serve as a model for what hope to acquire as they further develop as a leader. The attributes included:

- Good listening skills and ability to communicate
- Clear vision, with attention to detail while seeing the big picture
- Transparent decision-making
- Collaborates with others
- Stands up for what is best for the cause
- Trustworthiness, honesty, humility, and personal integrity
- Commitment
- Inspirational with passion and empathy
- Mentor for others
- Ability to weave together multiple strategies to achieve a common goal
- Organizational skills

- Remains calm under duress
- Motivated by what is best for team versus what is best for an individual
- Makes tough decisions and admits when they are wrong
- Leads by example, and is an advocate

In the final survey of 2020 that the CAs filled out, they noted the value they felt for a range of activities (1=not valuable; 2=slightly valuable; 3=moderately valuable; 4=highly valuable). The CAs found value in the fall workshops on leadership (3.6; n=40) and in learning about leadership (3.5; n=40); and in leading workshops on their campus (3.9; n=40). Instances of application of what they were learning to their practice supported their leadership development, and the topics of their on campus workshops focused on a range of teaching strategies learned in the project.

The CAs rated their agreement with the prompt about being seen as a person on campus with expertise to share on a scale of 0-100 at 91.7. Using this same scale, the CA rated their agreement with the prompt *My learning can help support the goals of my program/department* at 99.2. This comparison indicates that the CAs felt they were well positioned to act as agents of change at the local unit level of their program/department, and were beginning to be viewed by others on campus as having expertise to share. What remains unknown here is that after the teams' delivery of PD on their campuses if they will now be tapped more moving forward to conduct other PD, participate in campus committees and initiatives, and be thought of for mid-level leadership positions.

## LEADERSHIP RESPONSIBILITIES

In the final survey, half (22 of the 41) of the survey respondents indicated they had taken on additional leadership responsibilities over the year or felt different about their ability to lead. Additional responsibilities included: online master course developer; evaluator for all science faculty teaching online; tapped for committee work

Following are some examples of being tapped for new responsibilities and their connection to the SAGE 2YC project:

*I was asked to sit on our Diversity, Equity, and Inclusion taskforce after presenting our Cohort 3 presentation to our Chancellor.*

*I was asked to help the Dean of the Global Online Division develop in-house professional development workshops regarding aligning course outcomes & assessments.*

*I am taking on a full-time staff role to develop and implement curriculum that increases success of all students, and this program provided me with a strong backbone of knowledge & confidence in this arena.*

*As part of the campus workshop I am now responsible for developing, hosting, and presenting at institutional-wide professional development conferences.*

*Recognition by my Dean as an activist in educational out of the box thinking*

*Planning to lead a system-wide workshop in Spring 2021.*

*I have been invited to host a faculty workshop on Stereotype Threat through our Center for Teaching and Learning (and in general I think I'll continue to host workshops as I see needs).*

Several CAs also took on supporting roles in their programs/departments and took on new leadership roles on campus.

*Developing a geoscience pathway at my college to facilitate transfer of students to [local university] as geoscience majors.*

*Co-chair of teaching committee, lead adviser for merged Earth Science-Chemistry-Astronomy student clubs*

*I became department chair in the summer of 2020.*

*Leadership within my department for inclusivity and equity in our classes.*

*Faculty co-advisor of the STEM Transfer club and part-time faculty representative in the Science Advisory Committee.*

*Course-development liaison (helping with developing new courses and improving foundational courses).*

Examples of seeing their development of leaders included:

*Being able to talk to our administrators about what we need. Being a "newish" to the college I was a little scared to present or talk about the things I have been doing in my classes to change the ways students learn and this project allowed me to break out of my comfort zone and share with very positive feedback.*

*Although I have been teaching for a while, having the workshops and meetings during the summer truly gave me confidence and expertise on leading workshops.*

*I am the Biology Discipline Coordinator and Marine Option Program Coordinator on my campus and the SAGE program gave me tools to better manage these groups and take a more active leadership role this year.*

*Running for Faculty Senate*

Ways in which the CAs were sharing their expertise with others included:

*I'm leading a departmental equity work group and presenting at a school professional development event next month*

*Sharing my knowledge-gain with my colleagues*

*Our lab courses had never been online, and I volunteered to create an online version of the course (and teach it) during the summer, which then led to me applying for grant money to lead a team and develop the course into an online version that was approved by our online standards team in both 8-week and 15-week versions, and will continue to be offered online*



*even after Covid. I'm now one of the coordinators for the course, and am seen as an expert in the department on inclusivity in courses as well--and I'm an adjunct.*

*Designing and running workshops to help other geoscience colleagues  
Identifying equity gaps in our department and working to remedy the situation*

*I believe many of my colleagues will now be working with me on various class strategies like 'Scientist Spotlights' & other strategies that encourage our students from all backgrounds in their journey through college.*

*I've begun collaborating more with people from other disciplines in my own department. For example, a colleague in Astronomy/Physical Science and I are developing a 1-unit multidisciplinary field course as a way to provide another access point into the STEM pipeline for those who may not otherwise be inclined to major in a STEM field.*

*I have been instructed with organizing and setting up new online courses*

*I was required to train to become an online class instructor which also led me to be online course developer/coordinator for several classes.*

## **CATALYZING CHANGE AS CAS**

In their final presentations to peers in December 2020, teams were able to summarize the ways in which they were primed to help catalyze change on campus. As one CA offered, *The program supported my ability to catalyze change by legitimizing my role as a thought leader, and by providing the tools and framework for brining my knowledge to others.* Evident in some of their responses were alignment with two of the three project strands (improving success for all students and broadening participation). Identification of leveraging work with their administrators also emerged as a strategy to support change on campus. Working with partners to leverage initiatives and sharing information with others were identified as strategies as well.

### **Student Success**

*Learning about metacognition and active learning strategies has had a profound impact on our classroom activities as well as our students.*

*Learning new teaching pedagogies and leadership skills helped us refine our existing skill set while giving us a path for direct implementation*

*Learning about science identity and how we can harness this to help students feel confident to enroll in the geosciences has been ideal.*

*Provided education and strategies to improve our teaching and student success rates.*

### **Broadening Participation**

*All the preparation during our SAGE 2YC activities helped us to design & effectively execute our 3-part workshops on 'Inclusivity in our Classrooms.' We believe our workshops were a significant & very visible activity perfectly aligning with our college's major initiative focusing on 'Diversity, Equity, & Inclusion.'*

*Allowed us to seamlessly integrate with campus diversity, equity, and inclusion initiatives*

### **Supporting Change on Campus**

Teams also drew upon what they learned in the program about working with administrators, working with course-level data, and partnering with others to achieve change. Presenting their own campus workshop helped the CAs practice sharing information with others on campus, which helped diffuse learning on their campuses.

### **Campus Alignment**

*We recognized that our campus is currently reworking assessment as a mandate from an accreditation visit. We leveraged that knowledge to help us get our course level data, and will actually be sharing our results from that data mining to help the administration in its assessment work.*

*Considering the [College] vision, mission and values when explaining our action plan needs and goals to stakeholders.*

*Being encouraged to build relationships with administrators to successfully work “from the middle” in our institutions*

*An example: began to build a deeper relationship with our department head when discussing our options for workshops. He believed that our efforts were important and valuable. Since then, he has been very supportive of our efforts, including helping connect us with data and resources to best help the new STEM Transfer Pathway Club by identifying specific transfer challenges at LCC (and also in Oregon more broadly).*

*The program built our leadership skills by providing resources in leadership development (e.g., Bolman and Deal leadership styles) and recognizing that leadership roles can be informal.*

### **Working with Course-level Data**

*I think that the most useful part of the program was the data analysis presentation, as none of us had ever thought about how that data might be used to help guide our programs.*

*The student demographic data was quite revealing and caused both of us to include Scientist Spotlights in the course content to improve underrepresented students’ mindset about a possible science career.*

*Most useful was the task to collect/analyze student demographic and course level data. The research questions, and data collection/analyses enabled our action plans to become evidence based. Evidence-based plans are more sellable and executable.*

*One of the most useful parts of this program was getting a chance to really dig into the data of my program and pinpointing the problem areas that needed my focus in regards to student success.*

*SAGE allowed us to step outside the box and see what possibilities are out there to improve our teaching, conceptualize student research projects, assist with their transfer to 4YC, and*

*increase interaction with colleagues and students. It also allowed us the time to stop and analyze our campus and courses and how we can better serve our students.*

### **Diffusion of Learning**

*Our workshops offered an opportunity to share our favorite lessons learned with our colleagues at [College]. They have shared this information with others, referencing the workshops as a great source of guidance.*

*Having to teach the strategies we learned to our colleagues really strengthened our understanding and commitment to the use and effectiveness of these strategies.*

*Over the past year this project gave us important tools and information to share with colleagues with hands on experience through workshops.*

*Enabled opportunities for networking with other STEM educators; hence broadened our collaboration community.*

*Facilitated peer discussions which promoted both donor and recipient idea exchanges; created a learning community.*

*Peer evaluations of our action plans were insightful; promoted strategies to shape, finalize and execute our ideas.*

*Leading a workshop gave me an opportunity to connect with other Math and Science faculty members that I normally wouldn't have run into on campus. It allowed me to display and refine my soft skills such as leadership, attention to detail and organization.*

## 6. CAMPUS-BASED PD

The main question addressed in this section is:

- What did the teams learn from hosting on-campus workshops?

As part of becoming a Change Agent, Cohort 3 practiced leadership by hosting campus-based workshops instead of regional workshops at 16 institutions and 36 unique workshop sessions (Table 6-1). Participants attended from a range of disciplines and institutional roles, including faculty in Biology (36), Science (23), Math (21) Physical Science (19), math and science (18), Business (16), Chemistry (13), Geology (10). Also drew small numbers from counselling and student support services, library, education, information technology, health science, English, nursing, art, government, and more. Faculty attending the workshops were skewed towards more experienced, with 57% with over 10 years of experience.

These workshop sessions were well received with average satisfaction ratings ranging from 8.8-9.9 out of 10<sup>1</sup>.

### LESSONS LEARNED

CAs reflected on their campus workshops in short reports in terms of what participants reported as well as their own learning and next steps. The two predominant themes that emerged included aspects related to 1) engaging with colleagues, and 2) usable teaching methods and ideas. Engagement with colleagues included working and sharing ideas across disciplines, working together to improve virtual teaching, and the productive collegial environment. Teaching methods were described as usable and useful, translating well to virtual teaching, and valuable both as review and as new methods that could be readily incorporated.

Table 6-1: Campus based workshop sessions

Team	Session title	Theme
Anne Arundel CC	<a href="#">Increasing Inclusivity in Your Courses</a> (1. What is inclusivity, 2. Inclusive teaching Strategies, 3. Implementing Inclusive teaching strategies)	Support academic success
Central New Mexico CC	<a href="#">Creating and Fostering STEM Undergraduate Research at CNM</a> (2 sessions)	Professional pathways
Centralia College	<a href="#">Thinking about Thinking: Strategies to Develop College-Level Learners</a> (2 sessions)	Support academic success
Clark College	<a href="#">STEM Student Success Series</a> (1. foster inclusive learning communities, 2. empower students to be self-regulated learners, 3.cultivate students' STEM identity)	Broadening access Support academic success

<sup>1</sup> One rating of 1 was removed from results, as it appeared to be a mistake (where the participants other ratings were high and comments were positive)

<b>Delgado CC</b>	<a href="#">Removing the Distance Between You and Your Students</a> (2 sessions)	Support academic success
<b>El Paso CC</b>	<a href="#">Exploring Active Learning Strategies in the Virtual Classroom</a> (2 sessions)	Support academic success
<b>Fletcher Technical CC</b>	<a href="#">Pathways to Student Success in STEM: Incorporating Active Learning Strategies, Diversity, and Effective Course Design</a> (1. Active learning strategies, 2. Increase student engagement, inclusion, and diversity, 3. Effective course design methods)	Broadening Access Support academic success
<b>Georgia State University – Perimeter College</b>	<a href="#">Implementing Easy Active Learning Strategies for Improving Student Success: Promoting the Success of all Geology (STEM) Students</a>	Support academic success
<b>Houston CC</b>	<a href="#">Active learning for student success: clearing a path for easy implementation</a> (1. Active Learning for Increased Inclusivity, 2. Adapting active learning strategies for online learning)	
<b>Lane CC</b>	<a href="#">Workshop 1: Teaching Outside the Box: Implementing active learning strategies to increase student learning, retention, and success in STEM</a> <a href="#">Workshop 2: Toolkit for student success: Developing course-based undergraduate research opportunities across STEM to broaden participation and help all students succeed.</a>	Support academic success
<b>Leeward CC</b>	<a href="#">Bring the Alfredo sauce out of your class: developing active learning strategies to improve your class activities</a> (2 sessions)	Support academic success
<b>Monroe CC</b>	<a href="#">Rock Stars in the Classroom: Student Success and Retention in STEM</a> (1. Course level outcome data, 2. Science identity, 3. Make STEM content relevant)	Support academic success
<b>San Diego Mesa College</b>	<a href="#">Teaching the Earth: Active Learning Strategies and the 5E Model</a> (2 sessions)	Support academic success
<b>Santiago Canyon College</b>	<a href="#">Teach Students How to Learn- an insightful book review</a> (2 sessions)	Support academic success
<b>Suffolk County CC</b>	<a href="#">Workshop 1: You want your students to critically think. Are you sure you are really asking them to? Let Bloom's Taxonomy show you the way.</a> <a href="#">Workshop 2: Climate change is the defining issue of the 21st century. How do we fully educate our students on this issue?</a> <a href="#">Workshop 3: DiSC Profiles: How to Modify Your Behavior to Achieve Maximum Communication</a>	Support academic success
<b>Yakima Valley College</b>	<a href="#">Improving Student Success in Online Courses</a> (1. Self-regulated learning in an online classroom, 2. Maintaining a sense of community in an online classroom, 3. Active learning in an online classroom)	Support academic success

Table 6-2 below highlights the reach of the workshops devlived by CAs over the entire timeframe of the project. The campus-based nature of the PD sessions in C3 is higher than the single C1 and C2 PD delivered, which reflects the larger number of teams and CAs invovled in C3. Notably, the reach of the PD was 37% higher in the number of registrants compared to the sessions offered by C1 and C2 in 2019-2020. This high level of attendance during the pandemic may also reflect the opportunity to reach a broader audience due to the online delivery of the PD and the topics of the PD that could be immediately applied in online environments. Also, the C3 delivery of on-campus workshops included good representation of part-time faculty members (1 of 4 attendees). The focus of delivery on-campus provided increased diffusion of information, the opportunity for recognition of the expertise of the CAs on campus, and increased leadership confidence that resulted from planning and delivering the PD sessions.

Table 6-2: summary table of regional workshops (C1, C2) and campus workshops (C3)

Year	Number of workshops	Total Number of Registrants*	Registrant Role Type			
			Part-Time Faculty	Full-Time Faculty	Non-instructional Roles	No Response / Other
2016-17 C1	10	148	50 (34%)	79 (53%)	3 (2%)	16 (11%)
2017-18 C1	10	188	38 (20%)	104 (55%)	15 (8%)	31 (16%)
2018-19 C1, C2	17	149	28 (19%)	54 (36%)	4 (3%)	63 (42%)
2019-20 C1, C2	16	179	44 (16%)	107 (60%)	6 (3%)	22 (12%)
2020-21 C3	16 (36 sessions)	285	68 (24%)	193 (68%)	23 (8%)	17 (6%)
<b>Total</b>	<b>89</b>	<b>949</b>	<b>228 (24%)</b>	<b>537 (57%)</b>	<b>51 (5%)</b>	<b>149 (16%)</b>

## 7. THE PEER LEADER EXPERIENCE

The questions this section addresses are:

- How did peer leaders perceive a change in their leadership due to their participation with the C3 program?
  - Did peer leaders from cohort 1 and cohort 2 differ in their perspectives?
  - What elements of the program were identified by peer leaders as being most influential?

A call for peer leader (PL) applications occurred in November 2019. The application to become a peer leader outlined the programming the C3 CAs would engage in, and highlighted options for peer leader involvement. All Cohort 1 and Cohort 2 CAs were eligible to apply for this role. A total of 13 applications were received and all were accepted, with individuals volunteering for either short-term or long-term participation as a peer leader. The individuals selected as peer leaders had a range of experience levels with the SAGE 2YC project, with the PIs, and in their colleges and in the larger geoscience discipline.

The PLs included representatives from C1 (9) and C2 (4), including full-time faculty members (12) and adjunct faculty (1). Five were from the West Coast, four from the East Coast, and four from the central US. In addition to involvement with SAGE 2YC, PLs had prior experiences with NAGT, GSA, and campus-based leadership programming and positions.

### METHODS

This section reports on results from pre-program and post-program individual interviews with the PLs, and a final survey conducted in December 2020. Additionally, a review of the post-consultation reflections was analyzed for those PLs who conducted consultations with C3 Teams.

### THE PEER LEADERS AT THE BEGINNING OF THE PROJECT

We conducted an initial interview with each of the 13 peer leaders to serve as a baseline for their development over the year. Prompts included:

1. What do you hope to get out of your experience as a peer leader?
2. How will you know you are successful in achieving your goals?
3. Lots of change involves ambiguity. How would you describe how you feel when faced with ambiguity?
4. What type of support would help you be successful in your peer leader role?
5. Fast forward a year from now. How do you anticipate your leadership evolution?
6. In what ways have you been applying what you learned in the project to other realms of your work?

Codes developed for the analysis of these interviews included: Motivation, leadership, role, accountability, and management. Several themes emerged from these initial interviews.

## **Motivation for participation**

A theme that emerged at the beginning of the project was that the PLs were motivated to participate because they knew how much they personally gained from the project as a change agent, and they wanted to share this knowledge with others. As a result of their transformation due to the PD they received as CAs, they also noted how they realized that they knew something about teaching and learning that others do not and wanted to share.

### **Paying it forward**

*I feel I got so much shared with us in the past few years that I almost feel like paying it forward to share it with other people. You always learn something when you are the person sharing. I feel a bit of loyalty to the [the leadership team].*

*I want to cultivate more change agents by sharing my experiences and what I've gone through—kind of a transformation. I want to continue to build the community.*

*I want to continue maintaining the momentum of the project.*

*I guess part of my motivation is from seeing all the work that [the leadership team] have done previously. How much you helped me grown. And so, if I can even kind of pay that forward in even the smallest amount to sort of help others, I want to try and contribute in that way.*

### **Sharing knowledge**

*To continue to sustain this professional development effort, it is really important for the community, and without peer leaders it's not going to happen. I wanted to stay involved because I really believe in the goals of the project.*

*I hope to put some of the things that I learned into practice, and use some of the knowledge that I've gained.*

*I was hoping to transfer some of the knowledge I learned and experience. To bring the joy and satisfaction I've gained from the change agent program to more faculty.*

*The SAGE project was really transformative. It's like we've found a little honey pot in some ways, so I want to be able to continue to share that more folds.*

*This is for me an opportunity to pass on things that I've learning.*

### **Continued personal growth**

*I have had professional development before....but I've nothing that helped me transform my classroom as much as SAGE has.*

*I know almost nothing about virtual professional development and in particular, I have never interacted with any kind of synchronous professional development before. I'm really excited to learn about the benefits and the potential pitfalls, and how to get around those when doing all this virtually.*

*One motivation is selfish—I'd like to be more involved in the SAGE 2YC project because I found it rewarding. As we've done more projects or done more workshops and been*



*involved, you certainly learn and grow over time. Part of it too is just continuing to build those leadership skills and learning from folks. The [leadership team] is a wealth of knowledge and I would love to stay involved with them as much as I can to grow—both personally and professionally through the events.*

*The biggest hope would be really looking at how to improve my own skills.*

*I want to grow by being a mentor.*

## **Awareness of their leadership orientation built confidence**

Participation as a CA built the confidence of those who volunteered to participate as PLs. As a result of their prior SAGE 2YC PD, and increased self-awareness of their own leadership approach, several of the PLs were tapped on their campus to formal and informal leadership roles. Recognition of their talent by others on campus occurred, and they were asked to take on expanded or new roles. Some also stepped up to volunteer to conduct PD on campus based on strategies they learned as CAs. The PLs looked to mentors and leaders on campus to help continue their own development as leaders.

### **Confidence**

*I think I have a lot to offer [to the new CAs].*

*There is a measure of confidence that is developed [by being a peer leader] and when you want to learn something new, you commit to teaching it. So, that means I have to learn [about being a peer leader].*

*It's just been such an impactful experience, certainly the best professional development I've participated in. And it's given me the skills, tools, and confidence to become more of a leader and sharing my story. I'm looking forward to helping empower cohort three on their journey.*

*It's given me a lot more confidence so far that I can be a leader on my campus and that means when leadership opportunities presented themselves, I've jumped in.*

*I understand how to be given information and disseminate it, and kind of make it my own. I'm slowly starting to have a bigger vision that I could one day, push something on my own, and have the confidence to be a leader.*

*I don't like to toot my own horn, but I got one of our faculty excellence awards this year. I'm able to talk to other faculty members when they're talking about struggles in their class and provide them information.*

*I have all these tools and then confidence to use these tools, which has really helped me better advocate in this time of uncertainty with declining enrollments. I had imposter syndrome!*

### **Applying leadership on campus**

*One thing I really enjoyed with all of the SAGE stuff is seeing how other departments work. Because you get into group think in your own department. I can find out other ways of doing similar things.*

*Leading efforts to help folks do better things in their classrooms has been rewarding.*

*You know, one of the things that I would like to do going forward is to get involved in my own college and my college system, doing some professional development things.*

*Once we get more people in geology, hopefully, then I'll be able to step away and do something with the college or in the profession. Instead of being the recipient of the professional development, be more of the leader.*

*When I'm advocating for my program, I think about how I can advocate in the context of the college's mission and strategic goals. I'm working on finding opportunities for part-time faculty to participate in professional development that tie into the college goals on completion and equity—using data as well. We learned looking at our program and course level data that this was an important tool. I just didn't understand this before participating and kind of had all these "aha" moments.*

*I can lead by bringing what I've learned to my college and I really have a desire to lead. It just dawned on me that I can be a peer mentor here in my college, and I can apply what I learn this year to the faculty learning community on campus next year, and then just taking on other leadership roles—potentially serving as the Faculty Association president in the future. Just continuing to see where I can take those roles.*

*I'm trying to internally mentor new colleagues. "Here are all the active teaching strategies, things that really helped me!"*

*Because I'm always asking for data because I was working on a grant, I was asked to be on the data team. This group meets every week and we're always looking at different things. As far as enrollment and why students stop out, and how do we bring them back. That wouldn't have come about without my SAGE experience.*

*We've got seven part-time faculty and I was really trying to think about how to bring those part-time faculty in and build a sense of community. We had some social gatherings and really thinking of how the role that adjunct and part-time faculty can play and also in developing the program and what expertise they can bring.*

*Learning the active learning strategies helped me. Now I'm facilitating a new faculty seminar and I've shared materials with new faculty.*

### **Refining leadership orientation**

*I take a very deep breath and realize, mine's not the only right way. It's been taking a while, but I like to just say, "Okay, I can always put my ideas to the side." Other people's experiences are real. I think the experiences I've had have allowed me to be more open to other ideas and practices.*

*Running workshops is like making dinner at home and [in the SAGE program] I get to see 10 recipes. I want to make sure that I'm adding new options and new ideas [to my leadership]. I feel like at the end of this, I'm be able to draw on new experiences.*

*My first strategy is if there is anybody who knows more than me, I can go and check with them an ask. Because they figured it out, why should I go and try to figure it out?*

*I've gotten a lot from SAGE, and going to take on more teaching the leadership type thing—that would be the next thing.*

*Continuing to learn more and hone my skills, hopefully try to continue to take a reflective practice. I think just further developing my leadership skills and giving me more opportunity to think about where I can improve and what I can learn.*

*I think the biggest thing is really being able to understand how leadership at my school works and to be able to kind of sitting in the shoes of a dean or administrator to be able to frame. Let me step back as we have similar goals, but we don't necessarily have the pathways or the language. I have developed a tool set, which is really kind of being empathetic to what a leader is going through and thinking about what is important to them. SAGE has really helped me understand my place in the college's mission and strategic goals, where before the program, it didn't necessarily have as much meaning to me.*

*For me, it's been reaching out into the community and not waiting. Finding places where I can put myself to have the most impact. I didn't realize that because we have over 300 faculty members, who knew that I could be one of the ones leading things! Look for opportunities to reach out to the executive team or the dean and not waiting for them to come to you—you know being proactive.*

*I feel since participating in the program it helped me develop my network. It made me think about how I can contribute more on a national level and I see myself doing that in the future.*

### **Program Structure, Support, and PL Role**

The past experience the CAs had with the SAGE 2YC program contributed to their anticipation that the C3 program would have support structures and timelines to help them keep on track with their PL responsibilities. They saw the structure helping with the sustainability of the learning process as they could share their lessons learned and knowledge with others in a formalized program. Because of their prior experience with SAGE 2YC, they knew where to access resources and pointedly knew that resources existed to help support addressing the three strands of the project. Their new role as PL provided an opportunity to shift roles and take on a leadership position with the support of the PIs who outlined the structure of the C3 programming.

### **Predictability**

*I've already seen the model because I was in a prior cohort.*

*I don't expect any diabolical change.*

*I think it will be good for us [PL], and it's probably up on the website already, to have a clear bulleted list. These are the learning outcomes that we have for the cohort [C3].*

*One part I was thinking about is the efficiency, just being organized. Setting out what needs to be happen and by what date. It is such a natural extension of what we've been doing.*

*A structure of how to complete something that's very large; it is really powerful to continue to learn to walk through and can also translate to other projects.*

*It there's structure, and there's a lot...I don't really like to give talks or posters, but I find it makes me get a project done that I really do want to get done!*

*In past change agent activities, they were dictated and designed about what to do.*

### **Anticipated support from PIs and other PL**

*I think having support networks that you can go and talk to folks about it and say, "Hey is this what you're experiencing?"*

*Here's how you can pull in colleagues and folks to collaborate to help you because you can't tackle projects in isolation.*

*In addition to being a peer leader, I was looking to get some mentoring too. Talking to the PIs has been a tremendous help to me.*

*Being able to watch [the leadership team] helps me feel very supported, which helps with my confidence in my ability to do this.*

### **New role to refine leadership**

*I'm hoping that I'm going to be much more comfortable, as I'm totally uncomfortable now with like running Zoom meetings and doing webinars, and I don't have a lot of experience. I don't feel I'm a good moderator in an online group setting, yet I'm a good moderator in [face-to-face] group discussions. This project is going to make be better at this.*

*Last spring [2019] I applied for some internal strategic initiatives funds to create a STEM faculty learning community. I've been modeling the SAGE work in that project. I've taken my knowledge and skills in terms of running workshops into the world.*

## **PEER LEADER ROLES IN C3**

The peer leaders engaged in the program with increasing leadership role and responsibilities from spring to fall (Figure 4-1). In addition to these leadership responsibilities, PLs had additional PD opportunities, including sessions on active listening and thinking like an administrator to help the PL lead in place.

Figure 4-1: Peer leader role overview



Sessions led by peer leaders had high satisfaction ratings from CAs, including an average satisfaction rating of 9.4-10.0 on end of event surveys from the fall sessions. Below, Table 7-1 provides a listing of the summer sessions led by the PLs and Table 3-2 provides a listing of the fall sessions the PL led. Table 7-2 on page 48 indicates the value the PLs found in the various leadership opportunities they had in the project, and highlights how important it was to their leadership development to independently lead sessions with other PLs. As noted in Table 4.1 on page 24, the CAs found high level of engagement with the PLs during the project (83%).

Table 7-1 Summer Sessions Delivered by PLs

Session title	Theme
<u>Effective practices for promoting active learning in online classrooms</u>	Support academic success
<u>Using Scientist Spotlights to build students' science identity and shift their stereotypes of scientist</u>	Broadening access Support academic success
<u>Incorporating societally relevant, data-rich teaching materials into your curriculum</u>	Support academic success
<u>Engaging students by incorporating undergraduate research</u>	Broadening access Support academic success Career pathways
<u>Aligning your teaching with how students learn using the 5E model</u>	Support academic success
<u>The key elements of flipped classrooms in both face-to-face and remote learning environments</u>	Support academic success
<u>Supporting transfer through professional and peer networks</u>	Career pathways

### Peer Leader Consultations

Cohort 3 CAs had an opportunity to meet with a PL for a consultation. Not all PLs took part in this activity, and those that did were asked to reflect on this experience. These reflections included a prompt asking *How did these consultations contribute to your evolving leadership development?* Three main themes emerged in these reflections.

#### **Building on Passion and Past Experiences for Leadership Confidence**

*With many of the explanations or discussions I could actually remember having similar conversations with leaders during Cohort 1 which gave me a good base. It is also wonderful to see how I have grown since the start of this. I was able to ask the participants questions that I would not have been as comfortable talking about or giving examples about before I was a Change Agent.*

*I was able to continue to discuss and promote activities and pedagogies I am passionate about.*

*It was helpful to have me doing something completely independent of anyone else. I was nervous about doing them, but the experience will make me more comfortable in the future.*

*Yes, I feel like a leader when I get to share expertise I have developed.*

*I felt like I actually had something meaningful to contribute, and in that way, felt like I was able to lead a colleague in a small, informal training. Thinking about how to lead in different situations, and recognizing that leadership is not just what happens when you have a title or a big audience is important. Thanks for the opportunity to lead!*

### **Thinking Broadly**

*In both consults I had to think a little outside of the box. Not only to deal with the current situation with respect to remote teaching but also to deal with disciplines I'm not as experienced in.*

*I was not only able to chat with the people, I was able to think of ways to continue to collaborate. I had not thought of doing that before we began talking but I soon realized that we would accomplish much more if our conversations continued.*

*I was able to learn about her unique situation as adjunct faculty from a different region. I do not hear from other adjunct faculty very often, so it was nice to hear a different perspective and share my own experiences in that context.*

### **Actively Listening**

*Talking through the differences in laboratory experiences between geo and bio sciences has greatly helped me navigate my current situation at [College] where I am trying to coordinate the response and activities of all sciences. Actively Listening.*

*I think that that I was able to become a little bit better listener, which is something I certainly need to work on.*

*These provided the opportunity to listen to someone, learn about their interests/challenges, learn about their dept/program/institutional structure and help them develop plans to accomplish their goal. Hopefully these left the individual empowered to move ahead on their plans and to me that would be an example of successful leadership.*

### **Peer Leader PD Sessions**

Two targeted PD sessions were conducted for the PL. The first focused on reviewing active listening as a leadership strategy, and the second provided a macro perspective of administrator viewpoints to aid the PLs in understanding and leveraging conversations with administrators. Following are PL feedback on these sessions.

#### **Active Listening PD – How will this influence your work? Take Aways**

*While talking and knowing that someone was working on active listening, I saw what an active listener really looks like, and I will try to do that more with colleagues, bosses, and my*

students. It also made me aware of how much I value students that are active listeners. Before I would have just said that they were attentive, but this is more than that.

This workshop reminded me that listening is a series of steps that are very important and not taking these steps can cause a person to miss out on very important insights of information that you would otherwise get.

Hearing Pam talk about these steps in an official sort of way has also reinforced how important this is to do and why. It will certainly influence my leadership ability as a result, both with my students and with other colleagues.

I would say that I can perhaps take what I think are the most important pieces of active listening and try to apply them as I have conversations with students and colleagues. I guess the more you know about something the easier it is to try to address the issues you see within that matter.

It will be a great help! As I work with teams at my campus, with SAGE, with other organizations I'm involved with, I will be able to apply these lessons. Actively being a better listener, and also asking probing questions, will always be a positive.

I think that I will be more aware of how I can be more effective at listening and deliberate about it. In order to reach the goals that I set, I will need partners. Being a better listener as well as asking better questions, will make it more likely that I will reach my goals.

I think I will be a more shrewd observer of active listening interaction now. I also feel like some of these active listening techniques will make professional conversations less awkward because I gained some insight into how to volley the conversation back to the other person in a genuine way. Sometimes in professional settings, I feel like the person I'm talking to gives very terse answers and then there's a long pause.

### **Think like an Administrator—What was most helpful?**

It was interesting for me to see the other ways that people address their superiors. I find that I am a very firm speaker and I come in as prepared as I possibly can be to make sure no one tells me no, but I was really valuable to see some other personalities and how they attack the same situation.

Preparing for a meeting with an administrator by taking a macro view/view from balcony. Keeping in mind that the administrator needs to take larger picture into consideration.

To have all your information to hopefully answer every question. And to know how to best present to the specific person you are talking to.

My most helpful take-away for me personally was putting myself in the shoes of the Administrator and really thinking about their motivations from that angle. More specifically, it would be important to put a lot of thought into my request and being clear about how it would help the college/department/students instead of making it sound more personal was enlightening (and pretty obvious in hindsight).

To consider the view from the balcony. I love this.

## THE PEER LEADERS AT THE END OF THE PROJECT

To evaluate how PL felt about their leadership development at the end of the project, we collected data via a PL Survey and through individual interviews with Peer leaders. Final interviews were conducted with the PL to probe the ways in which they thought their leadership had changed over the course of the project and to ask what helped support their development the most. These interviews complemented the final PL survey outlined above.

The final interview protocol questions included:

1. How did your peer leader role meet your expectations?
2. Describe how your leadership has changed as a result of this Peer Leader role?
3. What contributed the most to your learning as a leader?
4. This year has been full of lots of change and ambiguity. What helped you manage the ambiguity?
5. In what ways have you been applying what you learned in the project to other realms of your work?
6. What do you see as your strengths as a leader? What would you like to continue to develop as a leader?

The survey asked PL to indicate how their various roles throughout the year helped contribute to their leadership development. Table 7-1 highlights their responses. (1=not valuable; 4=highly valuable). The PL found high value with most of their roles in the project, with the notable outlier corresponding to their role in responding to CA discussion boards. This outlier still was viewed as moderately valuable to their growth as a leader.

Table 7-2: PL ratings of how roles contribute to leadership development

PL Role	Value to leadership development
Contributing to Spring synchronous workshop sessions led by PIs (n=12)	3.8
Designing and leading a Spring synchronous workshop session (n=11)	4.0
Contributing to the webinar on course-level outcomes data (n=4)	4.0
Responding to Change Agent discussion boards throughout the Spring workshop (n=13)	3.2
Consultations with Change Agents (n=11)	3.7
Planning and leading June workshop sessions (n=13)	4.0
Planning and leading fall discussion sessions (n=13)	3.8
Project-lead Professional Development (e.g. active listening) (n=13)	3.7
Working with other Peer Leaders (n=13)	3.9
My role as a peer leader has helped me grow professionally. (n=13)	4.0
My role as a peer leader has helped me grow personally. (n=13)	4.0



## **Satisfying elements of PL Role**

### **Continued refinement of teaching**

*Being able to see and hear new ideas about teaching techniques and hone my own pedagogical ideas and techniques.*

*I've loved helping other colleagues in Cohort 3 learn about the topics that have transformed my own teaching. Love the lightbulb moments, and love learning from others!*

### **Continued involvement in SAGE 2YC network**

*Most satisfying is getting to continue to work with some of the core folks with whom I've enjoyed past collaborations, hearing about all of the excellent things that people from other institutions are up to, and facilitating good conversations and connections between participants.*

*Just as when I was a change agent myself, I find what has been most satisfying is working with other colleagues to gain their perspectives and insights into geoscience education. There is always so much to learn from others, and that aspect has continued to be very satisfying as a peer leader.*

*I have really enjoyed collaborating with both project leaders/staff and other peer leaders. I don't feel like I've always been the best at working with others, but find myself more comfortable with negotiating challenges towards shared goals.*

### **Refinement of leadership/Learning to lead**

*Practicing my leadership skills largely through designing and developing workshops. I have really enjoyed working with other peer leaders to design workshops.*

*When those in our sessions were fully engaged and active in what we were discussing and activities that we were doing.*

*It has been satisfying to get feedback from people saying that something I did was meaningful and/or helpful to them and their own personal growth.*

*I enjoy working with others, so I have enjoyed the interactions with the cohort as well as other peer leaders. I particularly enjoyed working with other peer leaders preparing our sessions.*

*I really enjoy working with my colleagues to develop programs. It's wonderful to talk through the issues and learn how everyone approaches solving the same problem while dealing with the nuances of each institution/program.*

*Being able to share my experiences with other faculty who are eager to try new initiatives. Being able to take that confidence [in leading] and transfer it to my own work on my campus.*

*The most satisfying thing has been seeing the participants learn and get excited about applying what they learned to their classes. Watching Cohort three get excited about the*

*things we are doing in SAGE 2YC and applying it to their classes. It is not unlike the satisfaction of seeing students finally get a concept and go on to be successful in the class.*

## **Insights Gained About Own Leadership**

### **Confidence in leadership skills**

*I have gained more confidence in developing workshops that are valuable to other faculty. In working with the cohort 3, I have also realized just how much I have grown as a leader myself since starting this project more than four years ago.*

*I think what I've gained is a knowledge that I can pursue projects with a larger set of skills (the right vocabulary and persuasive arguments) that doesn't just address the needs of faculty who work with me but can also support the administration that I work with. I also realized that there are techniques that I need to work on to become a better listener as a leader.*

*I've become more confident and comfortable speaking out, and trying to make my contributions meaningful and brief. My Peer Leader experience has helped me listen more carefully and be active in acknowledging others' voices and ideas, and responding to and amplifying those that I want to make sure are heard. I've been able to be more effective at advocating for projects I'm involved with, and people I work with, through some major challenges this summer that threatened to shut down one project.*

*Being a Peer leader has given me the time to reflect on how much I have learned over the years. It made me appreciate the amount of knowledge and experience I have. I have also become calmer somehow. Become a better listener.*

### **Leading with Others**

*I gravitate toward people professionally who have a similar work philosophy as I do.....namely, I look for people who are going to stick to the timeline that we agreed on during a presentation; people who are in favor of both parties doing their own thing.*

*I have experiences that are of value/interest to others. Sometimes all you have to do is provide a structure for people to get together to share ideas, rather than craft a jam packed workshop full of activities/prompts.*

*In working with other peer leaders that I had not previously worked with, I was able to identify my own personal strengths as a leader. I had grown so used to working with my Change Agent partner, and so it was important to see what other leadership strengths I had when matched with someone else (organization, timing, seeing the big picture).*

*I've enjoyed branching out and working with other Peer Leaders than my typically Cohort 1 team. I've been able to reflect more on my own leadership style, and recognize strengths and weaknesses that are often tempered by my 'normal' team.*

*I learned that I am capable of taking charge and bringing people along with me. That is not something I have typically even tried to do. I have become much more willing to try alternative paths to a shared goal. I used to be very much a type A person and once I had a*

*plan there was no changing it. Now I think I am more likely to explore and try somebody else's approach first.*

### **Awareness of Leadership Strategies**

*Since I tend to be a doer, when I am teaching and working as a peer leader I have to sometimes step back and let other people talk and work on things. I have found that it is very gratifying to see those that we were working with appreciated and learned from us.*

*How I give feedback to others really matters in how others receive it and use it. I try to frame feedback in a positive manner (not sure I always did as well before a peer leader). Being deliberate in how I provide feedback really affects how I work with others to accomplish goals. Also, thinking about how to search out for allies to help me achieve my (or our shared) goals.*

*I have become much more willing to try alternative paths to a shared goal. I used to be very much a type A person and once I had a plan there was no changing it. Now I think I am more likely to explore and try somebody else's approach first.*

*Running workshops is getting easier and easier.*

### **THE CA PERCEPTIONS OF PEER LEADERS**

At the end of the Spring Sessions, the CAs were asked 1) *How useful was it to have the Peer Leaders involved in the synchronous sessions in addition to the Project Team?* 2) *How useful was it to have the Peer Leaders commenting on asynchronous discussion posts?*

The CAs noted how the PL provided a perspective aligned with their own experiences as they were recently CAs themselves. Hearing from the PLs what did not go so well for them helped avoid similar missteps and highlighted that implementing new teaching strategies requires practice to fine tune. Even reading the PL bios helped prior to engaging with the group in activities.

*The peer leaders are necessary because they can tell us what they did that worked or didn't work-- we don't have to reinvent the wheel. Also we can get ideas and spring off of those ideas (contour them to our specific institution and needs).*

*Having the peer leaders was also highly valuable. Hearing about projects in progress or projects that have recently completed was inspiring. I learn a lot from watching and hearing from others. It was also incredibly valuable to hear we all share similar struggles and have similar concerns. Even though we are spread far and wide across the country, we are still one in the same. And to have this cohort to go through that with, with the experience from the peer leaders, was highly valuable.*

*This was one of the most productive aspects of the entire program. I gained a lot in a the short amount of time we had with the peer leaders. In some ways I wish we had more time to go into more detail about their experiences.*

*It was most useful to have peer leaders comment on the discussion posts. They provided advice before it was even asked. Their experiences made them knowledgeable in many different aspects.*

However, not all interactions were as useful. For example, one CA noted *Honestly, not super useful. The one time I really thought they were useful was in the first meeting, but then I reached out and they never responded.* In the asynchronous format, PL commentary was generally useful, yet a few comments to the contrary were offered, which also reflected CA perceptions of the discussion threads too: *The shared experiences from the peer leaders were helpful in the asynchronous discussions, although at times it just seemed like some of the comments were a simple matter of saying something within the discussions.; Too much! So many different opinions and not really being able to respond and start a discussion.; The discussion posts were less helpful for me, as I don't do well following threaded discussions, especially when the comments are lengthy, detailed, or refer back to 3 or 4 other posts back.*

The CAs rated the PL fall sessions highly (3.8 of 4.0; n=41), and also rated engaging with PL (3.8; n=41) and PL consultations highly (3.7; n=40).

## **SUMMARY**

Designing and leading workshops contributed the most to how the PLs felt they developed as leaders. They noted growth on both a professional and personal level. There was not a difference in the perception of growth or change between PLs from C1 or C2. The motivation to participate did not differ between cohort groups, and members of each cohort had evidence of leadership on their own campus or in professional associations. The opportunity to learn more about leadership skills was valued, and putting these skills into practice helped CAs see these skills in action.

## 8. THEORY OF CHANGE

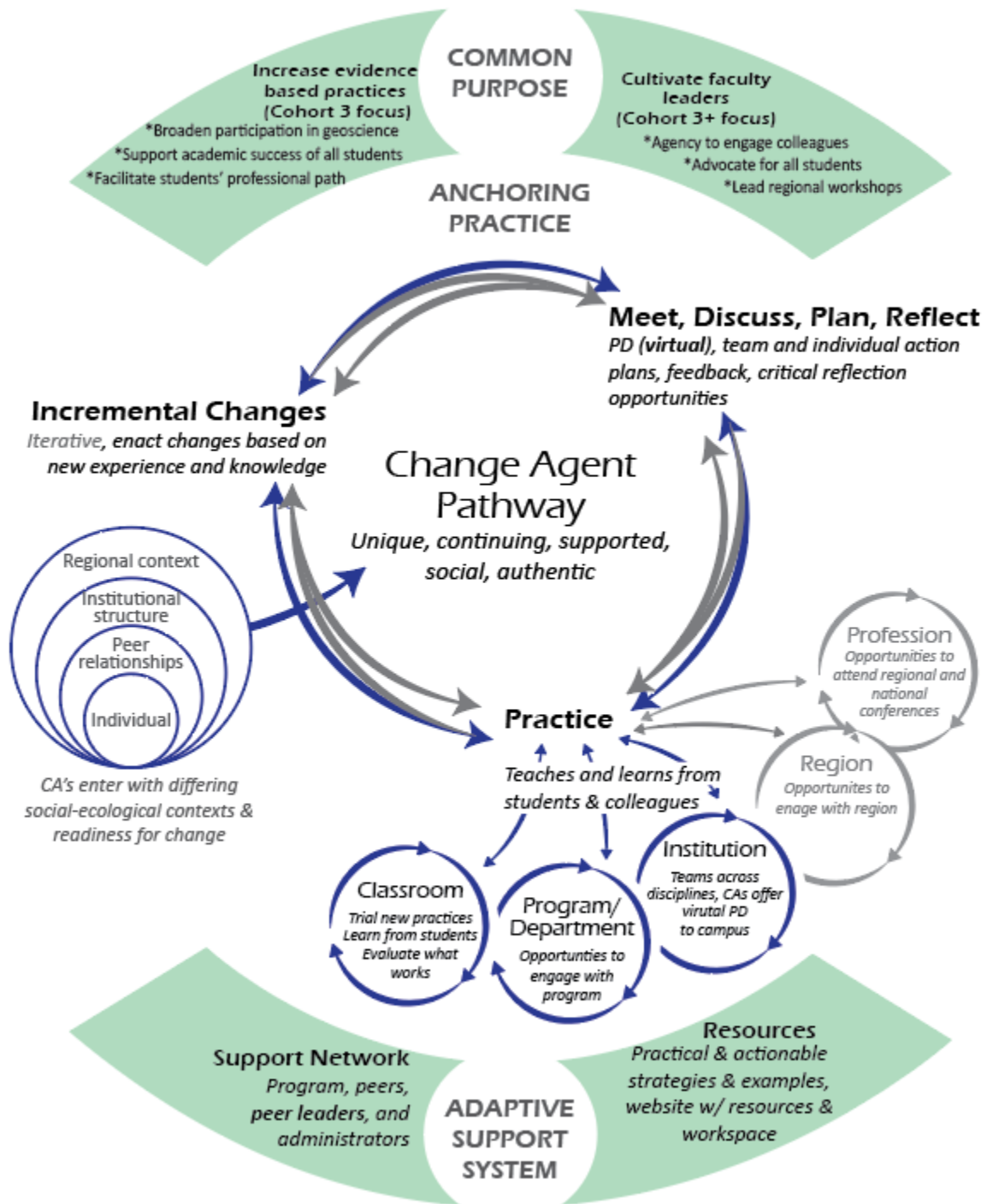
While the implementation was adjusted to a more compressed timeline, multidisciplinary teams, and a broader range of disciplines, the overall theory of change remained largely the same as prior cohorts.

The CAs enter the program with varying contexts and readiness for change, so the program is designed to be flexible and supportive to this variation. Cohort 3 tested the incoming differences further, by including CAs from a broader geographic and disciplinary ranges, higher diversity of institutions and students, and faculty position types (see Section 2). The core cycle of 1) meet, discuss, plan, reflect, 2) practice, and 3) incremental changes remained the same. Deviations from the C1 and C2 versions are noted on Figure 8-1 as deemphasized aspects (in grey) and additions to the program (bolded).

From the evaluation data, we see CAs reporting the teaching practices and community building as more valuable than leadership aspects of the program (e.g. Fig 4-1 & 4-2). This may indicate that participants were more ready to change familiar aspects first (teaching & peer network), and that the groundwork for leadership development has begun (e.g. Section 5) but may take more time to develop. While the same content from C2 was covered with C3, the compressed 1-year timeline resulted in fewer opportunities to iterate, as compared to prior cohorts. The cross-disciplinary teams and campus-based workshops (rather than regional workshop) resulted in an increased focus on campus level change and broader interactions across disciplines. Peer leaders were incorporated as a new support mechanism, providing opportunities for CAs to learn for peers with more experience enacting changes, even with the compressed timeline.

The C3 enactment also highlights that the Theory of Change is centered on individual CA changes, where PLs are also continue going through a cycle of learning, discussing, reflecting, and practicing.

Figure 8-1: Cohort 3 enactment of ToC



## 9. LESSONS LEARNED AND RECOMMENDATIONS

The evaluation of the SAGE 2YC Cohort 3 project helps extend the prior work of the SAGE 2YC program and highlights how a totally virtual environment involving extended PD opportunities for participants. The engagement of Peer Leaders who had prior experiences in the program served to provide an opportunity for peer-to-peer learning, and bolstered leadership development for the PLs.

1. The money mattered and showed value for the participants' time, and no doubt influenced the high number of adjuncts in this iteration of the project.
2. With less opportunities for iteration, more focus on the immediate classroom changes. The delivery of the on-campus PD was viewed as a means to apply what they were learning about strategies. Yet, the level of identification as a change in seeing themselves as leaders was not as strong.

### Lessons Learned

Several key lessons emerged in this extension project of SAGE 2YC.

- **Lesson #1: Program structure and support matters.** Like other forms of PD delivery, it is important to have a clear outline of expectations for participants, which includes expectations and deliverables. This project benefited from prior iterations of the workshops, in both face-to-face form and in virtual delivery. This structure was particularly helpful given the abrupt disruption caused by COVID-19 in March 2020.
- **Lesson #2: Change occurs first locally.** The theory of change highlighted how the PD sessions focused on changes in teaching practice provided direct up-take by CAs into their classroom experiences. CAs commented how they could immediately put into practice the information they were learning in the workshop sessions. The opportunity to conduct campus-based workshops provided the CAs an opportunity to share with others what they were learning and expanded the diffusion of changes in teaching to a broader audience.
- **Lesson #3: Inclusive involvement.** The high level of community noted by the CAs illustrates that community building can occur in a virtual environment. The high number of adjunct and part-time faculty involved modeled inclusive practices in bringing together full-time and part-time faculty. Spotlighting adjunct faculty as leaders of PD on campus provided an opportunity to show the expertise these campus members bring to the institution.
- **Lessons #4: Building campus connections.** Campus connections occurred in two ways. First, the multi-disciplinary teams brought together faculty from different programs on campus, which does not always occur without some form of structure like that provided by SAGE 2YC. Second, even though administrator involvement was not built into the program as it was in prior iterations of the

SAGE 2YC program, the CAs all had the opportunity to meet with their administrator to give an update on their projects, and several of the on-campus workshops leveraged ongoing institutional initiatives and were elevated to campus-wide events.

- **Lesson #5: Development of faculty leadership.** Naming of Peer Leaders in the project gave these CAs an opportunity to further develop their leadership, and they noted that leading PD sessions and consulting with the C3 CAs provided opportunities for them to lead. Likewise, the C3 CAs received positive feedback on their delivery of PD on campus, which helped increase their self-efficacy regarding their leadership potential. Several CAs took on additional leadership roles during the course of the project.
- **Lesson #6: Valuing and recognizing faculty time.** The higher stipends for C3 CAs provided symbolic (and real) validation of the time that the participants would devote to the project. Many adjunct faculty do not have access to campus-based or disciplinary PD programs. The stipend represents a significant amount for an adjunct given the rates of adjunct pay commonly available.

## Recommendations

This virtual PD program provides several recommendations for faculty members and campus leaders, researchers, and funders.

1. **Faculty development spurs change:** The investment in faculty development results in immediate changes in classroom teaching. Learning more about evidence-based strategies to build inclusive learning environments provides improved classroom environments that create a sense of belonging for all students. The modeling of good teaching by classroom faculty also influences the teaching of peers, and begins to build a culture on campus for student success.
2. **Leadership occurs at multiple levels:** Recognizing that faculty are leaders spotlights their work as instructional leaders, and when faculty members understand how their role contributes to institutional initiatives, they can leverage larger change on campus. Giving faculty members the opportunity to lead PD on campus reinforces their leadership development and provides them with a broader view of campus operations.
3. **Using data influences attention to equity:** When faculty members have an opportunity to look closely at their classroom data, it becomes more evident what students are not achieving the same levels of success relative to others. This awareness can spark changes in teaching practices, supplemental supports for students, and larger engagement with campus members on ways to support equity on campus. Developing an equity mindset begins in the classroom and extends to the entire campus.



4. **Developing an inquiry mindset:** When faculty members are exposed to evidence-based practices and data analysis, they begin to develop an inquiry mindset. This type of orientation makes them more informed and allows them to begin focusing on research within the college, which can support the discipline literature and research on the Scholarship of Teaching and Learning.