



Lasting Impacts of the Leshner Leadership Institute

Retrospective Evaluation Report

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Background

About the Leshner Leadership Institute

The Purpose of LLI

Since 2015, the Leshner Leadership Institute fellowship program has engaged a cohort of 10-15 mid-career scientists and engineers each year, providing them with training, mentoring, and opportunities. The purpose of the program is to **empower these scientists to lead high-impact public engagement and advocate for institutional change to further support public engagement by scientists.**

Each cohort brings together scientists and researchers working on a similar topic – an area of science with an important and timely connection and relevance to society. This allows them to consider their public engagement goals from a similar context of questions, concerns, and opportunities as a network. The first five cohorts convened a total of 67 Fellows, organized around the topics of:

- Climate change (2016-17)
- Infectious disease (2017-18)
- Food and water security (2018-19)
- Human augmentation (2019-20)
- Artificial intelligence (2020-21)

Program Components

The fellowship experience consists of a week-long intensive around public engagement and science communication training. During that week, Fellows also develop a personal public engagement plan. Over their fellowship year – and beyond – the Fellows work within and between institutions to advance public engagement. AAAS supports and mentors them throughout this process.

There are several ways that they are intended to build and show leadership:

- Developing and implementing their own **public engagement activities;**
- Building institutional capacity through **training, mentoring, and/or supporting other scientists** in public engagement work within their institutions, communities, or networks;
- Building institutional capacity and **broadening support for public engagement** work at their home institutions and communities.

The strategies and levers used to further these goals vary widely, based on the context, priorities, and goals of each Fellow.



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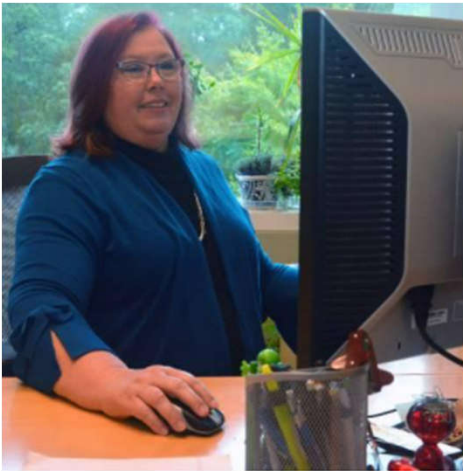
Office of Communications | Center for Public Engagement with Science & Technology | Leshner Leadership Institute for Public Engagement with Science

AAAS News

Anita Nikolich Encourages Asking Questions about AI to Combat Misinformation



Our Focus: Retrospective Evaluation



21 SEPTEMBER 2020

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Leadership Institute for Public
Engagement with Science

AAAS News

**Tracey du Laney
Empowers Staff to
Become Science
Ambassadors to
their Communities**



Why Conduct a Retrospective Evaluation?

The Leshner Leadership Institute fellowship program (LLI) is a large-scale and ambitious effort. Each Fellow develops and implements a unique public engagement (PE) plan, designed specifically for their goals, context, and strengths. While some work has been done to evaluate immediate takeaways from the initial week-long intensive, understanding and systematically documenting the types of impact that Fellows experience and generate as they return to their home institutions around the world becomes far more difficult.

There are so many possible impacts, so much diversity of experience and priorities among the Fellows, it can be difficult to nail down whether and what longer-term impacts truly result from this year-long, supported Fellowship experience. Particularly given LLI's goal of making lasting change in individual PE activities *and* in institutional support for PE among all scientists, there was a need – after five years – to take a look back with the Fellows to uncover what has actually happened, what can be traced back to the LLI experience, and how pervasive those are across the diverse group of 67 Fellows/alumni.

Evaluation Questions

Following a process of discussion and prioritization with the AAAS team, we focused on four guiding evaluation questions:

1. To what extent do immediate outcomes sustain and are mid-term outcomes achieved in the year(s) that follow the LLI fellowship?
 - For the individual Fellow
 - Toward organizational change
2. From the Fellows' point-of-view, what is the value of the Fellowship in adding to their professional lives – as researchers, in public engagement, and as leaders?
3. What qualities or attributes of LLI are most instrumental to generating value and impact?
4. How do Fellows describe the types of changes they've noticed in *public response* to their post-Fellowship outreach?

Study Methods

Sequential Mixed Methods Approach

To answer these retrospective questions, we used a nested, sequential, mixed methods approach. This allowed us to benefit from both the in-depth and nuanced nature of qualitative data, alongside quantitative data to more precisely measure the extent of the outcomes.

We used a qualitative-quantitative approach to the study – one-on-one interviews, followed by a broad survey of all past Fellows. By beginning with the qualitative phase, we could delve into and better understand the breadth of longer-term outcomes experienced by Fellows. Rather than beginning from assumptions, interviewees provided ideas, categories, and language to describe what outcomes really look and sound like in their lived experiences. With this grounding, we could construct a more targeted survey to determine how common those stories of impact are across the population of Fellows.

Qualitative Phase: 1:1 Interviews

We conducted 1:1 interviews with 11 past Fellows, drawing from all five cohorts of alumni. We used purposeful sampling to recruit interviewees, with a maximum variation approach. By seeking Fellows who came from diverse settings and experiences applying the LLI experience, we hoped we would uncover the full breadth of reactions, outcomes, and perspectives about the program's value (or lack thereof). We purposefully sampled to ensure our interviews included a mix of:

- Home institutions: government, industry, and academia (including public and private)
- LLI Cohort (and field of study)
- Gender
- Level of ongoing contact/connection with AAAS (since their fellowship year).

Interviews were audio recorded and transcribed. Transcripts were coded inductively – drawing themes and patterns directly from the words of participants – to articulate the common themes and patterns that emerged in Fellows' discussion of impacts, program value, and audience response.

Quantitative Phase: Survey of Alumni

Building upon the qualitative analysis, we developed a questionnaire to explore the extent to which those outcomes were present among the population of past Fellows. Instrument items were crafted using themes and language of the qualitative results. Survey language emphasized there was no expectation that all items were true for all Fellows, encouraging candid responses.

The questionnaire was distributed using an online survey platform to all 67 LLI alumni. We used a census approach, seeking feedback from as many as possible to get a full picture of the impacts. Email reminders were used to encourage participation over ~3 weeks.

In total, 49 Fellows partially or fully completed the survey – a 73% response rate. This is a very strong response to a survey of this nature, which means AAAS can be reasonably confident that the results here present a strong picture of the experience of the vast majority of LLI Fellows. We discuss the response rate by cohort in more detail on the next page.

Background

Study Participants

The overall response rate of 73% was evenly distributed across the five cohorts – there was no bias based on cohort.

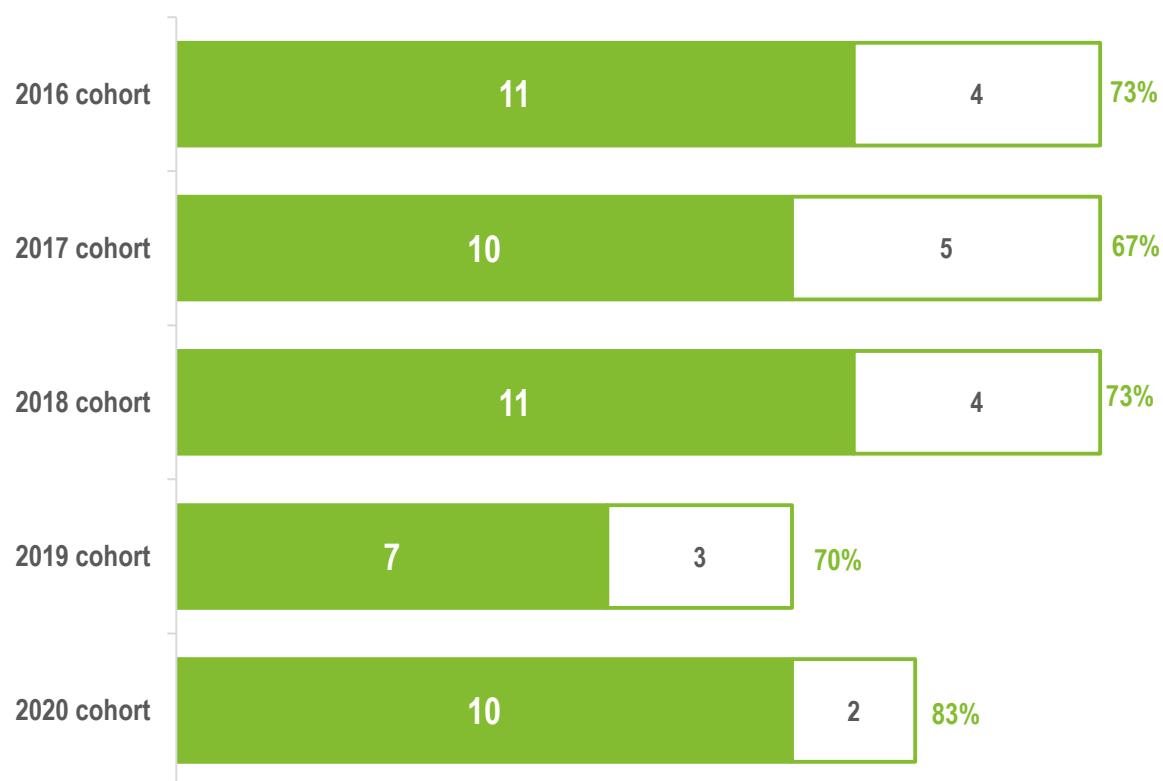
The 49 survey respondents were evenly from the five cohorts; 70%+ from each year participated. Participation from 2020 appears slightly higher, but this was a slight difference.

In the interview phase, 11 Fellows came from all five cohorts. While most Fellows work in academia, interviews strategically sampled those who work in government and the private sector, as well as several types of academic institutions. Interviewees included, men, women, and different levels of staying in touch with the LLI program since the fellowship.

In this report's analysis, we compare results for Early Cohorts and Recent Cohorts. We grouped the first three cohorts as Early (2016-2018) and the final two as Recent (2019 & 2020). Recent Cohorts have had less time to experience long-term changes, and notably, both had their entire post-Fellowship period affected by the impacts of COVID-19. The one-week intensive for the 2020 cohort was entirely virtual.

Survey Response Rate by Cohort Year

The green portion of the bars shows the number of Fellows from each cohort that responded (partially or fully) to the survey; the white portion shows the number who did not. Percentages indicate the response rate from that cohort.



Results

**Impacts on Public
Engagement Activities**

Results: Impacts on Public Engagement Activities

Expansion of Public Engagement Work

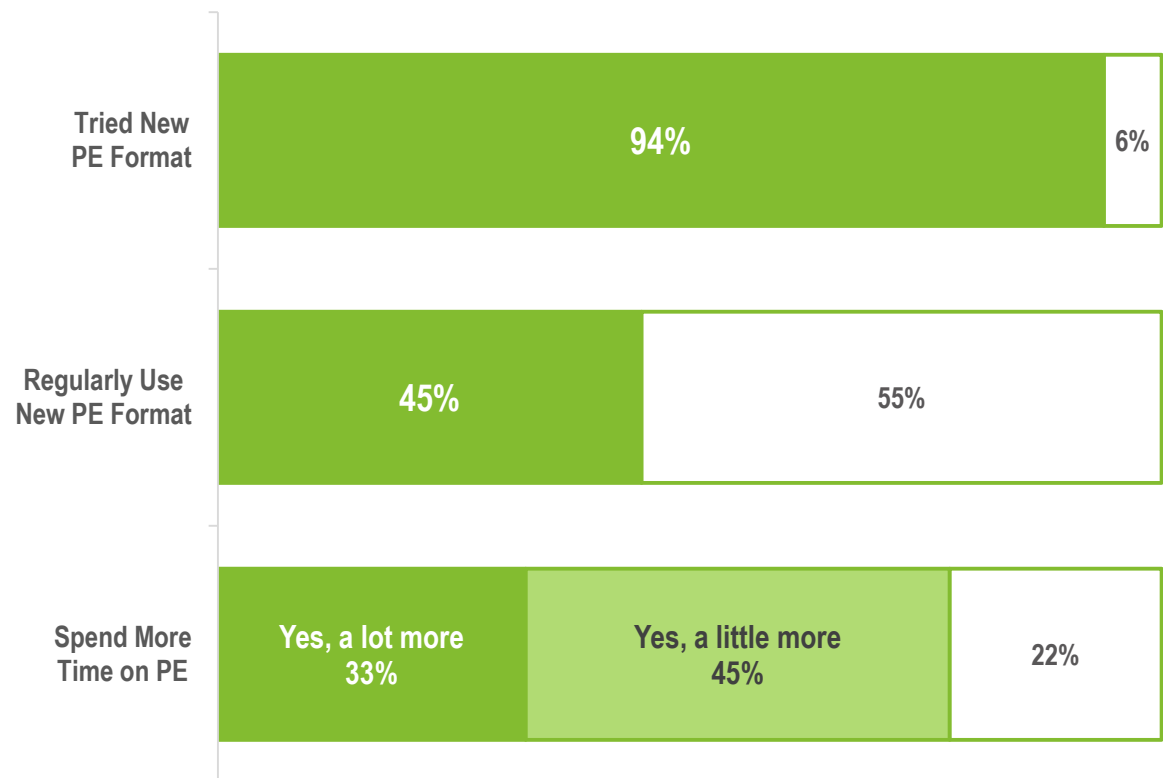
LLI clearly has an impact on expanding Fellows' time and experimentation with formats and media for doing public engagement work.

Almost every Fellow who responded to the survey reported that they had tried a new PE format at least one time during or after the program. This clearly shows that in exposing Fellows to a range of formats, media, and opportunities, they have the chance to experiment and try communication methods previously unused. Moreover, around half of Fellows reported that they have come to regularly use one of those new formats or approaches in their PE work, which is a substantial impact on the practice of the group.

Perhaps most important to LLI's goals, 78% of responding Fellows reported that, since the end of their fellowship year, they are still spending more time on PE work than before. It appears that, even after the year of support and encouragement ends, the prioritization of these activities remains high, despite the very full schedules of the Fellows.

Experimentation and Expansion of Public Engagement Work by Fellows (n=49)

Fellows reported whether they had tried (at least once) a new format or medium of PE during or after LLI, whether they've continued to regularly use a new format/medium, and whether they generally spent more time on PE since LLI.



Results: Impacts on Public Engagement Activities

How Public Engagement Has Expanded

When they described the ways that their public engagement activities have expanded or grown, trying new formats and increasing the frequency of engagement were often intertwined.

As these quotations illustrate, Fellows described a range of ways that they used or came to emphasize new forms of PE in their outreach work. This often emphasized that they had taken up a form of PE that they felt they never would have tried or actively avoided prior to the Fellowship. Many Fellows credited LLI with giving them the confidence, skills, and “push” needed to experiment with new and different forms of PE.

Descriptions from alumni, collected in interviews and survey responses, about specific ways they have expanded public engagement activities

“I have increased the amount of public policy work that I've been doing. We had the one day that LLI set up where we met with some congressional staffers... as a result of that, I made a couple of calls to people that we knew, and [I have a] meeting in two weeks with the head of the AI task force in the Office of Science and Technology Policy.” – Interview 2020 Cohort

“The guidance from LLI gave me confidence to try ‘out of the box’ PE methods, and simple do’s and don’ts that I can use myself and share with others--like keeping videos < 3 minutes and having a ‘professional’ tone in social media.” – Survey 2016 Cohort

“My LLI experience gave me the confidence to try new modes of PE, especially writing for non-scientific audiences.” – Survey 2020 Cohort

“I’m not necessarily comfortable sharing my opinions online... But I’ve started tweeting about articles that I find interesting that are relevant to my vision for my organization.” -- Interview 2020 Cohort

“I improved my interview skills (as an interviewee). I use Reddit more frequently after working with it at the LLI. I am more successful in producing social media content with higher visibility.” – Survey 2019 Cohort

“I’m writing an opinion piece almost, for a trade magazine about the topic that I work on. ...I would have never otherwise taken work time to do that activity, or even maybe done that activity and that’s the third one I’ve done in the last three years.” – Interview 2017 Cohort

Results: Impacts on Public Engagement Activities

Changed Approach to Public Engagement

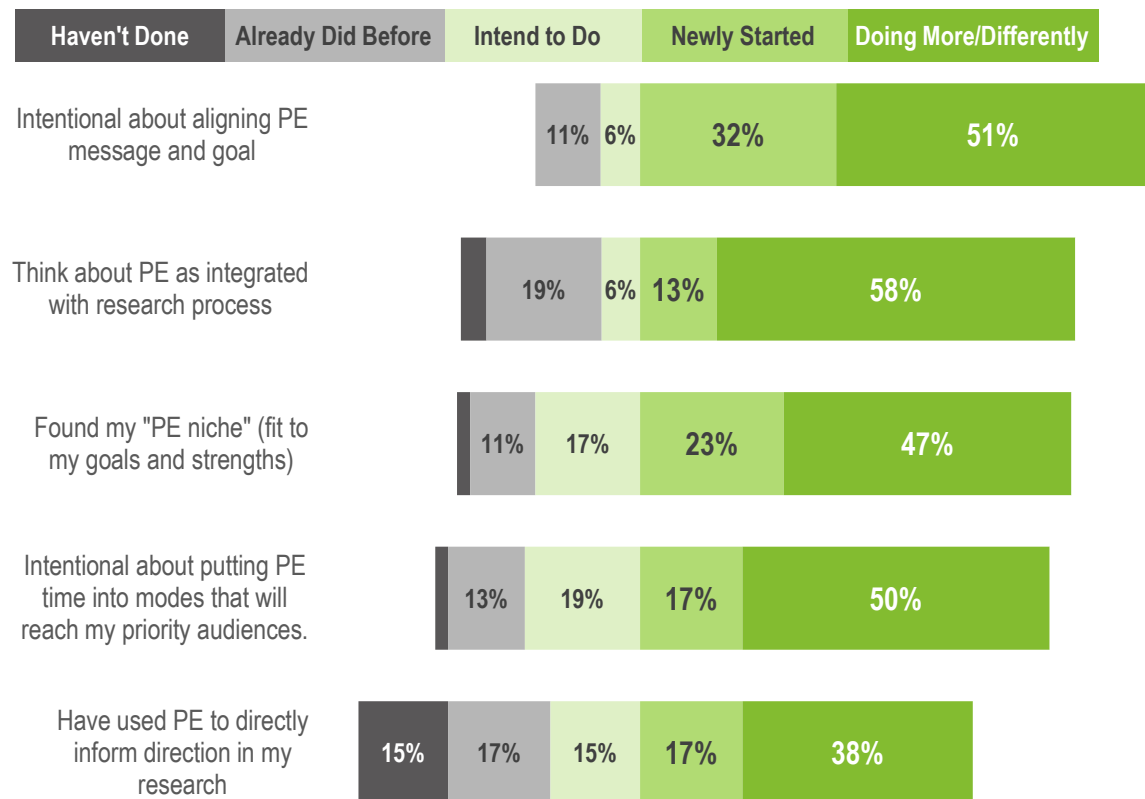
90% of responding Fellows reported they made at least one of these five changes in approach to PE during or following LLI. Notably, 83% became more intentional about aligning message and goal in their public engagement.

Clearly one of the biggest outcomes of LLI, which was also repeated in many of the interviews, was the emphasis on **aligning the message with the overall goal** for public engagement. This was also the item that was most frequently felt to be an entirely new approach. While that was the strongest item, in each statement, the majority of respondents indicated they had made changes to their practice in some way.

Interestingly, the item that had the strongest response of having made a change to an old practice was in **thinking about PE as integrated with the research process**. In contrast, using PE to directly inform or shift the direction of research was the least frequently reported – although it was still a change for 55% of Fellows.

Changes in Fellows' Approach to Public Engagement During and After their LLI Year (n=48).

Distributions of how many Fellows reported making specific types of changes to their approach to PE activities due to their LLI experience. *Wording of statements has been slightly truncated for this graph.*



Results: Impacts on Public Engagement Activities

How Approaches to Engagement Have Changed

Fellows' descriptions of how they have adapted their engagement activities to be intentional and strategic illustrate the deep mindset shifts that underlie the survey results.

As these quotations illustrate, there were two main themes of greater intentionality that emerged. Some described being more intentional, thoughtful, or deliberate about their messaging. Specifically, the descriptions address how Fellows think differently about what they try to communicate, how they frame a message, and how they align the message with specific goals and audiences.

The other theme was Fellows who described being more intentional about what media or mechanisms they used. This included thinking strategically about which media would have the greatest impact for their goals or was the best fit for their skills and style. This included the idea of finding one's "PE niche." This intertwined with being more intentional about audience, and thinking about PE media that would reach the audience(s) they prioritized.

Descriptions from alumni, collected in interviews and survey responses, about specific changes to the approaches and intentionality of public engagement activities.

"The fellowship helped me make PE an intentional part of my research planning and execution. Before I was more aspirational, which mostly meant it did not happen." – Survey 2020 Cohort

"I don't do public engagement in the way that is focused on, I don't know, increasing one's curiosity with science or awareness of it. [Instead,] it's a very sort of intentional engagement, and very intentional outcomes that I am striving towards." – Interview 2016 Cohort

"I'm trying to both be more intentional about my PE work and align it with the research goals I have. I think before LLI I thought of them as being a bit more separated, but I've come to see that I can align them and am working towards this." – Survey 2020 Cohort

"I think I've shifted my portfolio quite a bit. Before it was more scientific talks and academic engagements, and now I'm saying no to more of those and yes to more of these public engagement pieces. ...[LLI] changed public engagement and public communication around science [from] something I did on the side and elevated it to a core piece of the work that I do." – Interview 2017 Cohort

"More thoughtful about the time commitment and opportunities of doing PE well. I feel like I have many more PE related ideas that I have the time/ability to implement, which is frustrating, but I learned that it is better to pick and choose and do some things well." – Survey 2019 Cohort

"The main impact I would say is really purposefully thinking about public engagement and how it can be integrated in different ways. My personal PE is a work in progress as I discover what works for me as I try new strategies that were introduced." – Survey 2019 Cohort

Results: Impacts on Public Engagement Activities

Differences in PE Changes by Cohort

Fellows from early LLI cohorts showed significantly greater change in practices in two areas – finding their PE niche and using PE to inform their research.

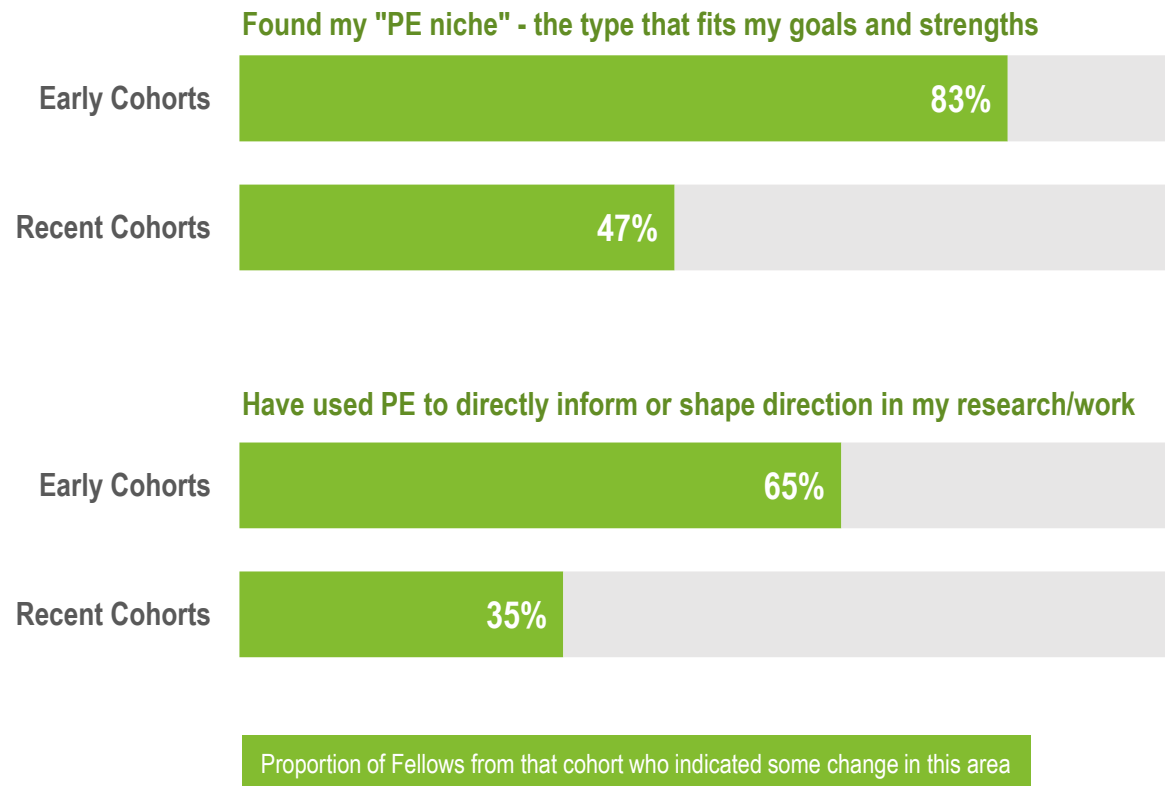
On the whole, Fellows from all cohorts reported similar levels of change in their PE practices, regardless of how much time has elapsed since their Fellowship year. But on two outcomes there were large differences.

Nearly all Fellows from the early cohorts felt they had “found their niche” for PE work – settling on the type(s) of PE that best fit their goals and their strengths. This was true for only around half of the most recent cohorts, who may still be in the process of trying things and settling into what works best long-term.

There was also a rather large difference in using PE to directly inform or shape research. Elapsed time could contribute to this, but it also may reflect disciplinary differences. Early cohorts (climate, food/water security, infectious disease) may have more easily seen ways for PE to directly inform their research than more technology-focused recent cohorts.

Ways in which more Fellows in early cohorts changed PE practice than newer cohorts.

Comparing the proportion of respondents from the Early Cohorts (1-3, n=31) and from the Recent Cohorts (4-5, n=17) who reported change in their practices – either newly starting or doing it more/differently since LLI.



Results: Impacts on Public Engagement Activities

Ways that PE Approaches Stayed Stable

While the trend across Fellows was that a range of changes to PE approaches occurred, interviews gave some context for those individuals and outcomes where there was not a substantial change.

As the quotations to the right illustrate, there were times when individual Fellows felt they hadn't experienced much change in one or more of the areas we were evaluating. For example, a Fellow who felt that there wasn't a great change in format or frequency because they were already doing a large amount of PE prior to the Fellowship.

Others noted that the pressures of time, funding, or prioritization have meant – in one way or another – Fellows felt they have not been able to sustain change over the longer-term.

Some of the examples highlight the challenges uniquely faced by the two most recent cohorts, as they navigated trying to implement changes in practice in the midst of a pandemic, which impacted many factors of time and access to PE opportunities.

Descriptions from alumni, collected in interviews, about limitations, barriers, and reasons that their approach to PE has not changed dramatically.

"I do think that for many of us, myself included, we had a level of engagement that was high before and continue to be high afterwards. Maybe it's not exactly in the same directions, but I probably do a 200–300-person public lecture every month, and I've done that for the last 10 years, and I will probably do that for the next 10 years. And that's not changing." – Interview 2020 Cohort

"I think my public engagement still tends to be pretty opportunity-driven and less... I guess you could even say it's more reactive than proactive. And I think a lot of that is related to the effort involved. In my research projects, I certainly continue to try to work towards engagement, and as with all kinds of engagement, it's just more time and effort and money, and there's never enough of any of those things." – Interview 2018 Cohort

Q: Do you feel like you've been able to maintain a high priority on public engagement as part of your own practice during this fellowship leading up to now?

"Yes and no. Yes, as in, I know if the work is done, I know whom to reach out and how to do it. But no, in the sense that I have not been able to think of a good audience and plan things around it... I think the audiences which I knew I had before, those are the same audiences I know now. So, my current approach is still that I do whatever my research, and so on... and then engagement is an afterthought."
– Interview 2020 Cohort

Results: Impacts on Public Engagement Activities

Impacts on Insights, Confidence, & Energy

Interview data also confirmed other evaluation conducted by AAAS that the experience creates strong positive outcomes for the Fellows as individuals – impacting their knowledge, confidence, and enthusiasm about PE.

The quotations from Fellows on this page and the next illustrate the range of ways Fellows described individual impacts and benefits they experience as PE professionals.

The experiences during the week in DC, learning from experts in many fields, the coaching of the AAAS team, and the experiences of practicing what was learned all combined to give the Fellows new “aha” moments about aspects of PE, as well as the confidence and skills to achieve the behavioral outcomes reported elsewhere in this report.

Descriptions from alumni, collected in interviews, about impacts to their insights about PE, confidence in their own skills, and energy and enthusiasm for PE work.

“Now that I feel comfortable engaging with our corporate communications and doing the public engagement with our organization, I am much more involved in that and publicizing the good of the science that we’re funding, the impacts that we’re making on the state through the university systems. I am practicing what I learned nearly every day.” – Interview 2019 Cohort

“One of the biggest takeaways is how many people were doing engagement and how well they were doing it and how little you had to reinvent. Just by talking and connecting with a bunch of people, it became really clear that there’s already really good ways of doing engagement and by engaging the right people, you could have a much larger impact than trying to reinvent stuff yourself.” – Interview 2018 Cohort

“[LLI] made me prepare better, with respect to how to organize information, how to communicate, what is the outcome we are trying to do and the engagement plan. Understand the audience, how to plan it out. So, the process side—that learning has been very helpful. It has brought in some of the activities which I was anyway doing, but it has brought more structure to it. Which actually helps you, it makes you more confident.” – Interview 2020 Cohort

Results: Impacts on Public Engagement Activities

Additional Examples of Impact on Confidence

“For example, over the last week, I've had to engage the public probably even more than during the program, because I had a couple of speaking engagements. And I ended up in a world that I hadn't planned, and it spiraled, and it ended up involving a lot of social media interactions.

“And I think that the experience of the fellowship put me in a better space to know how to manage that and how to leverage it into something that's useful rather than just shying away from it and not engaging with it....

“Because something similar happened before the program and my reaction was just to completely ignore it...and I just didn't engage with anything at all, which I think it was maybe too much of a risk averse approach. And being forced, I think maybe like a gentle introduction to public engagements gave me the experience to be able to deal with something similar.” – Interview 2020 Cohort

“I make an effort to respond to requests for interviews from media – radio, tv, written. I'm still nervous but feel that is why I trained to do this – to be a voice for science...” – Survey 2018 Cohort

“I have become more confident talking to people of different backgrounds. Not that I was not confident before, but it's also the more you understand how others have communicated and what has worked in different situations, there's a culture thing.” – Interview 2020 Cohort

“I've had the confidence to speak up and say 'Hey, I have training in this. This is one of my skillsets. Let's work on this more.' And 'Let's make it a part of my work plan.' And 'I can train you in these skills too.' I don't think it would have happened in that same way [without the LLI experience]. Both, because of, again, the confidence that it gave me and the recognition that it gave me in an organization largely of scientists.” – Interview 2017 Cohort

Results

**External Impacts:
Professional Advancement**

Results: External Perceptions & Advancement

Organizational Respect & Higher Profile

Experiencing new or increased respect within one's organization, related to PE, was a clear, lasting impact of being an LLI Fellow. In particular, 73% of Fellows reported having a higher profile in their organization after LLI.

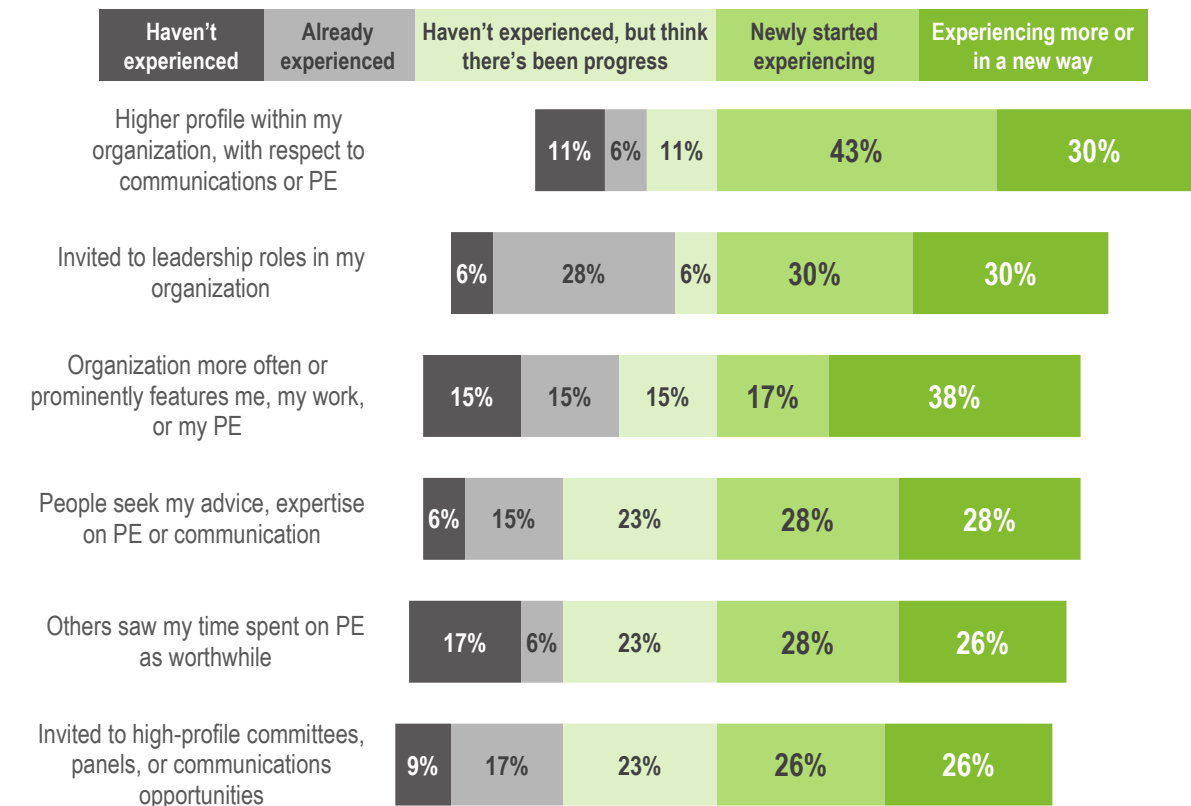
This theme was often described as an important impact of LLI in the interviews. And the survey data confirms that 81% of responding Fellows experienced at least one of these changes in external perceptions.

Within that, each item showed around 50-60% of Fellows having experienced it, which likely highlights that each Fellow experiences a different mix of ways their profile changes, but it has happened for most. Notably, for several of the items – being sought out for advice, perceptions of the time investment in PE, and being invited to high-profile service were areas where about one-quarter could see progress, even if it hadn't happened yet.

Being invited to leadership roles was most often selected as a response that was true even before LLI.

Fellows' Experience with Higher Profile and Respect within their Organization (n=47).

Distributions of how many Fellows reported experiencing specific changes in how others perceived them, respected them, or invited them to opportunities after LLI. *Wording of statements has been slightly truncated for this graph.*



Results: External Perceptions & Advancement

The Impacts of a Higher Profile

In interviews and open-ended survey responses, Fellows spoke about a variety of ways they had seen others' perceptions of them shift after the Fellowship, including respect for expertise, having a higher public profile, and becoming a source of information.

The quotations on this page highlight a few examples of how Fellows noticed others in their organization reacting differently to them or their investment in PE work.

The interviews made very clear that they felt these outcomes were tightly tied with the prestige, reputation, and quality of the training received through AAAS. The quotations on the next page illustrate those feelings from the Fellows.

However, the experiences they shared strongly suggest that, while the AAAS may open some initial doors, it seems that the Fellows' skills and expertise as strategic communicators is what moves them through those doors and maintains and advances their profile and ability to achieve impacts.

Descriptions from alumni, collected in interviews and survey responses, about specific impacts of having a higher profile, respect, and influence in their organizations.

"I do think it gave me credibility. It allowed me to identify common goals and values amongst my organization and myself as it relates to science communication. And it opened a lot more opportunities for me because of that recognition. 'Hey, you're an expert in this.', 'Oh, this is important.' and 'Wow, we can use you in this capacity.'" – Interview 2017 Cohort

"I think it changes how colleagues react to me. I think it helps define a tone. It helps define a tone in terms of my intentions with engaging with the public. ... there are lots of different intentions on engaging with the public. And I think that something like the Leshner Fellowship kind of sets the tone for what you're doing when you're trying to engage with the public. You're trying to be more of a resource. And you're not necessarily seen as a person who is kind of showboating or just kind of creating yourself." – Interview 2020 Cohort

Results: External Perceptions & Advancement

Examples of Experiencing a Higher Profile

LLI Fellow, Dr. Maria Elena Bottazzi, featured in an ad about her institution's vaccine research in the *New York Times*

BY THE NEW YORK TIMES, THURSDAY, SEPTEMBER 10, 2020



PROUD TO VACCINATE THE WORLD AGAINST COVID-19

Dr. Peter Hotez and Maria Elena Bottazzi and their team of scientists from the Texas Children's Hospital Center for Vaccine Development know that the world will never return to normal until the majority of our population is vaccinated. That's why we developed effective, safe and cost-efficient vaccine technology that can be used worldwide — ensuring that people everywhere have access to life-saving medical care. As the world continues the fight against COVID-19, we are uniquely positioned to leverage over a decade of research and development to help vaccinate the world. Everyone has something to get vaccinated for. Join us in the fight against COVID-19 by donating today at [TexasChildrens.org/vaccinate](https://www.texaschildrens.org/vaccinate) the world.

Where *Texas* gets better.



Descriptions from alumni, collected in interviews and survey responses, about specific impacts of having a higher profile, respect, and influence in their organizations.

“It does elevate my position within my organization, provides me a bigger megaphone through which to communicate... It shows to my colleagues that I'm engaged with a broader professional network, that I'm still bringing in new information... It increases one's relevance. ... It does open doors, gets you seats at the table, all those cliches about more influence within an organization.” – Interview 2016 Cohort

“Prior to the training, I was never asked for quotes. I was never asked for my opinions. Now people within my organization ask routinely for quotes to go along with our materials that are being presented out.” – Interview 2019 Cohort

“I think the visibility has helped the perception of me as a leader.” – Survey 2019 Cohort

Results: External Perceptions & Advancement

The Value of AAAS in Raising Fellows' Profile

"Since the award I have been promoted and I have received new opportunities in my career in non-engagement areas. While it is hard to say whether the AAAS award helped, I assume it did as it is a concrete stamp on my CV. I believe the award title it provided a stamp of approval that my ideas, initiatives, and efforts were 'validated' for public communications that are otherwise unfamiliar or not reviewed. ...

"As a result of the validation, in my department, I have been entrusted with teaching classes in this area and running the departmental Twitter account.

"This is of course time not spent on other tasks that might be more prestigious research directions efforts, as this work remains less well-respected than other discipline-specific skills, or contributions, publications or grants." – Survey 2018 Cohort

"I'll note that I often say 'the AAAS suggests...' or 'When I was trained by AAAS, they recommend...' This sometimes gives more weight to my recommendations, especially to scientists who are dubious that PE can come across as not-so-serious or undermine credibility." – Survey 2016 Cohort

"Now that you can say, 'Oh, I participated in an AAAS sponsored workshop on public engagement. And then I wrote a follow-up popular press piece that would...' All of a sudden now you can extend that umbrella of credibility to a wide range of actors basically. And then what you [can do] is you're just bringing more legitimacy to this being a foundational part of science." – Interview 2018 Cohort

Results: External Perceptions & Advancement

Career Advancement

Overall, 72% of responding alumni reported that having been an LLI Fellow positively contributed to their career advancement – tenure, promotion, or getting a new position.

If we limit the question to only those who reported having experienced any kind of career change since their LLI experience, 81% of those alumni reported that LLI was a positive contributing factor.

These two quotations from interviews illustrate two examples of when Fellows were aware that their LLI participation had a positive influence on their career trajectory. Themes we heard in these comments included a positive institutional response to the Fellow's skill-building and development of expertise, as well as instances of the Fellowship providing a "stamp" of legitimacy to the Fellows' investment of time in PE and outreach work – that it is not a distraction from high-impact research, but a complementary and supportive endeavor.

Proportion of Fellows Who Felt LLI Contributed to their Career Advancement (n=49)

When asked if their LLI Fellowship was a contributing factor in career advancement, such as getting tenure, promotion, or a new position, whether or not they felt LLI was a positive contributing factor.



"I got a promotion because of my participation... because I was invested in professional training [on PE]. It was really, really well received within my organization. When promotion talks were happening, [the response] was, 'Look she's really advancing her skills, advancing herself in training opportunities, finding training opportunities, really grasping onto new concepts.' Since public engagement was not a role my group within the organization had ever done." – Interview 2019 Cohort

"I was pre-tenure when I was selected, [and] so I was just about to submit the tenure, I was in that process of thinking about that. And having recognition that not only as a leading scientist in this area, but also the official stamp that this stuff [PE work] was legitimate, I think was a very good thing to have, particularly with AAAS having that voice and that influence was particularly powerful." – Interview 2016 Cohort

Results: External Perceptions & Advancement

External Impacts that Take Time to Achieve

Fellows from the early cohorts of LLI showed significantly greater change several key areas of how they have been perceived post-Fellowship, including LLI contributing to career advancement.

External perceptions and career advancement were areas where there were a number of notable benefits that appeared to require more time between the Fellowship and measurement to achieve.

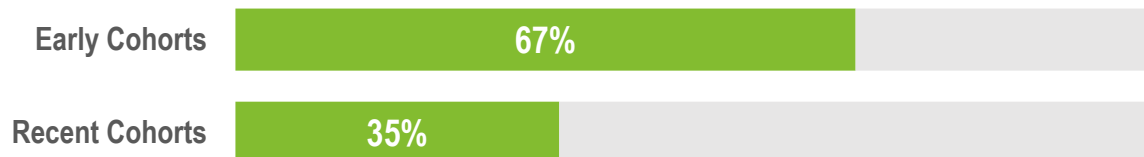
While there were not big differences in feeling that they had achieved a higher profile, in general, due to LLI, the specific outcomes of being more prominently featured by the organization or being invited to high-profile committee or panel service were relatively more common for those who had been out of LLI for at least 2 years.

Career advancement, intuitively, was a clear outcome that required some time. But after that time has passed, it seemed to be quite common; over 80% of early cohorts reported this outcome. For newer cohorts, this was at just around half of the Fellows.

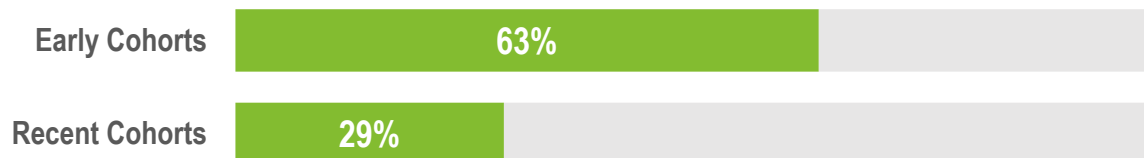
Ways in which more Fellows from early cohorts experienced changes in external perceptions.

Comparing the proportion of respondents from the Early Cohorts (1-3, n=25) and from the Recent Cohorts (4-5, n=14) who reported change in external perceptions or advancement – either something that newly starting or happened differently/more often.

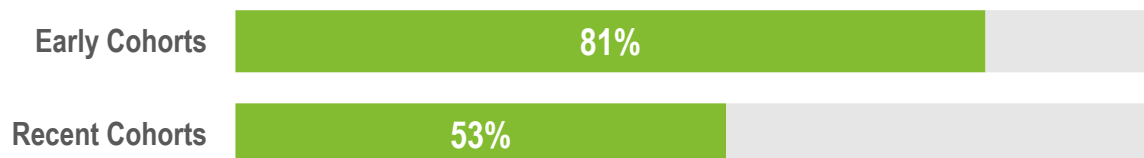
Been more frequently or more prominently featured by my org



Invited to high-profile committee service, panels, or other opportunities



LLI was a contributing factor in career advancement in some way



Results: External Perceptions & Advancement

Barriers to Advancement

For those who have experienced less of a sense of advancement in their career or profile, qualitative data suggest it is because of persistent mindsets in academia and/or the need for more time to see those changes occur.

As the examples to the right highlight, if there is little or no existing institutional buy-in or interest in the role of PE or outreach in the career of an academic researcher, that can place an external limit on how much the Fellowship contributes to changes in career advancement or certain types of raised profiles. Nevertheless, these Fellows tended to recognize that this wasn't their main driver or the type of benefit they wanted to get from the program.

The other factor, as the prior page noted, is that some of these impacts take a longer time to emerge. So, for more recent cohorts – particularly having grappled with the many ripple effects of the pandemic on their institutions and careers – they may see positive signs of movement, but not have actually achieved change.

Descriptions from alumni, collected in interviews and survey responses, about barriers or limitations to experiencing a higher profile or career advancement.

“I don't think LLI hurt my career, but in academia I feel like there isn't so much emphasis on PE vs. other traditional dissemination methods such as publications. I do think my PE has gotten the attention of colleagues and raised my profile among my colleagues.” – Survey 2017 Cohort

“My institution seems to be unaware that things like this are important, despite their rhetoric about public engagement. The LLI was been extremely valuable to me in my career progression, although not in a formalized get-a-promotion sense.” – Survey 2020 Cohort

“My position has always been as a research scientist, and so money becomes a huge barrier, because if I'm funding my salary on grants, there are big limitations to how much... The way that the time it takes to do public engagement can be written into those.” – Interview 2018 Cohort

“I think this is still on going -- I for sure have been asked for things in terms of speaking and engagement that I haven't been before, but I see this as an ongoing process. So, I think LLI has helped but may be too soon to tell.” – Survey 2020 Cohort

Results

**Impacts toward
Organizational Change**

Results: Impacts toward Organizational Change

Coaching & Training Others in PE

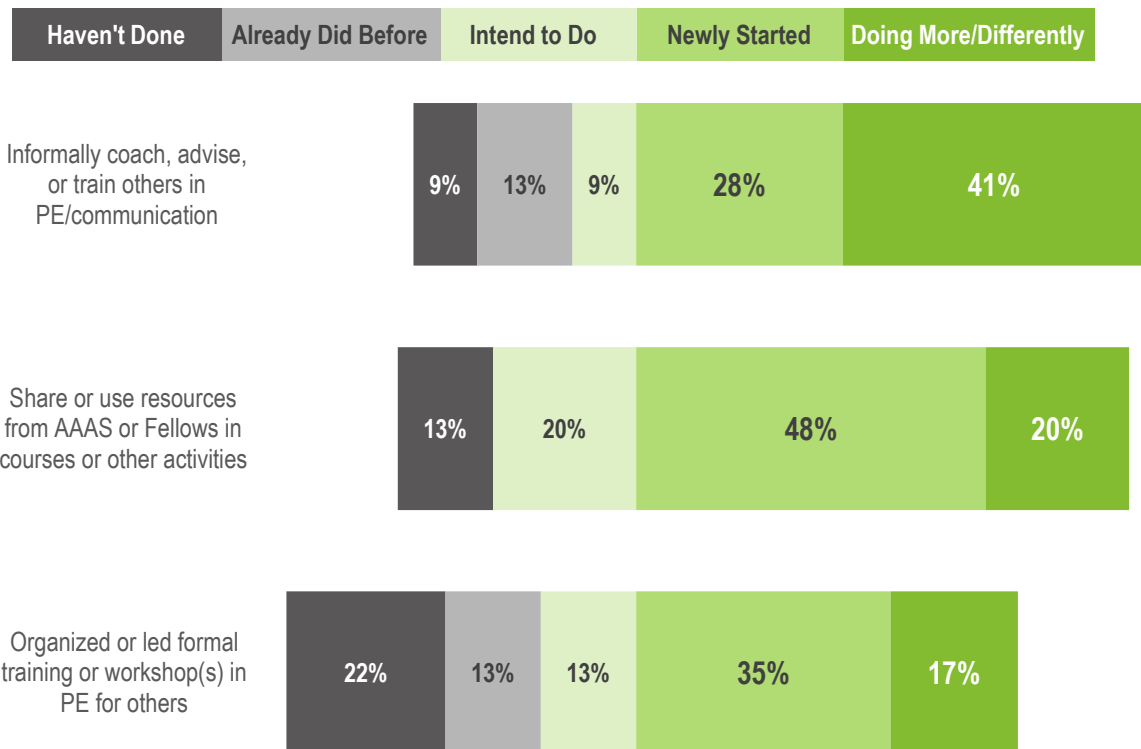
68% or more of the responding Fellows indicated that they had taken new or different actions to become a coach, advisor, trainer, or distributor of PE resources from their LLI experience.

Running alongside the findings in the prior section, where Fellows reported experiencing a higher profile, respect, and being viewed as an expert in PE and communication, the majority of responding Fellows also reported that they have taken the role of informal coach or advisor on PE and communication issues in new or different ways than before they started LLI. Similarly, sharing resources from AAAS was a frequent strategy taken by Fellows in their teaching or other activities.

It was relatively less common for Fellows to initiate formal PE trainings or workshops – whether led by them or by an external training group they helped bring in. However, even this action was reported by just over half of the responding Fellows.

Fellows' Experience Becoming Coaches and Trainers of PE in their Organizations (n=47).

Distributions of how many Fellows reported made specific changes in leading, facilitating, or organizing PE trainings for their institutions during or after LLI. *Wording of statements has been slightly truncated for this graph.*



Organizational Change

Results: Impacts toward Organizational Change

Improving Organizational PE through Coaching

Fellows shared a number of specific examples of how they have worked to be coaches, trainers, and resources to raise the level and skill at PE of those they work with, teach, and supervise.

The examples shared by Fellows in interviews and open-ended survey responses highlight a wide range of ways that they have become coaches and mentors for those they work with around the skills and practices of effective PE, drawing on what they learned in the training.

Supporting the findings from the quantitative data, examples of organizing formal trainings are somewhat less common; instead, the narratives highlight ways that Fellows became day-to-day experts and advisors of those they work with and supervise when it comes to effective and impactful PE work.

Descriptions from alumni, collected in interviews and survey responses, about specific examples of serving as a PE resource, coach, or trainer in their organizations.

“As part of the COVID-19 response, we have a group of 18-21 public health officers that have no communications training whatsoever, but they are the individuals that are interacting [with the public] across the country... I saw them as trusted resources within communities that need to be our mouthpiece...”

“We developed a lot of materials [for them]... I did several town halls with them, that they could see. And I would sit in on town halls with them for their first 3 or 4 town halls. So, they'd have me for support, they could see how I would answer questions, how I would do my intro. I would give them kind of a cheat sheet of resources.”

“And now, for the past eight months, they've been doing it all on their own. So, it's been really effective.” – Interview 2017 Cohort

“I found the PE materials very useful for students and have shared them widely. This has also helped me in my courses, which include an explicit focus on science communication and PE.” – Survey 2020 Cohort

“Coaching faculty on media communications and sharing tips. Helping students curate their public presence, formally and informally, as one of the few social media active faculty. Helping faculty try to build some more skills. Promoting and validating those that do engage successfully, by celebrating their accomplishments and efforts. Teaching methods to students and getting this on the agenda. Dealing with some of the double-edged sword - and risk management aspects - of social media presence.” – Survey 2018 Cohort

Results: Impacts toward Organizational Change

Encouraging & Setting Expectations

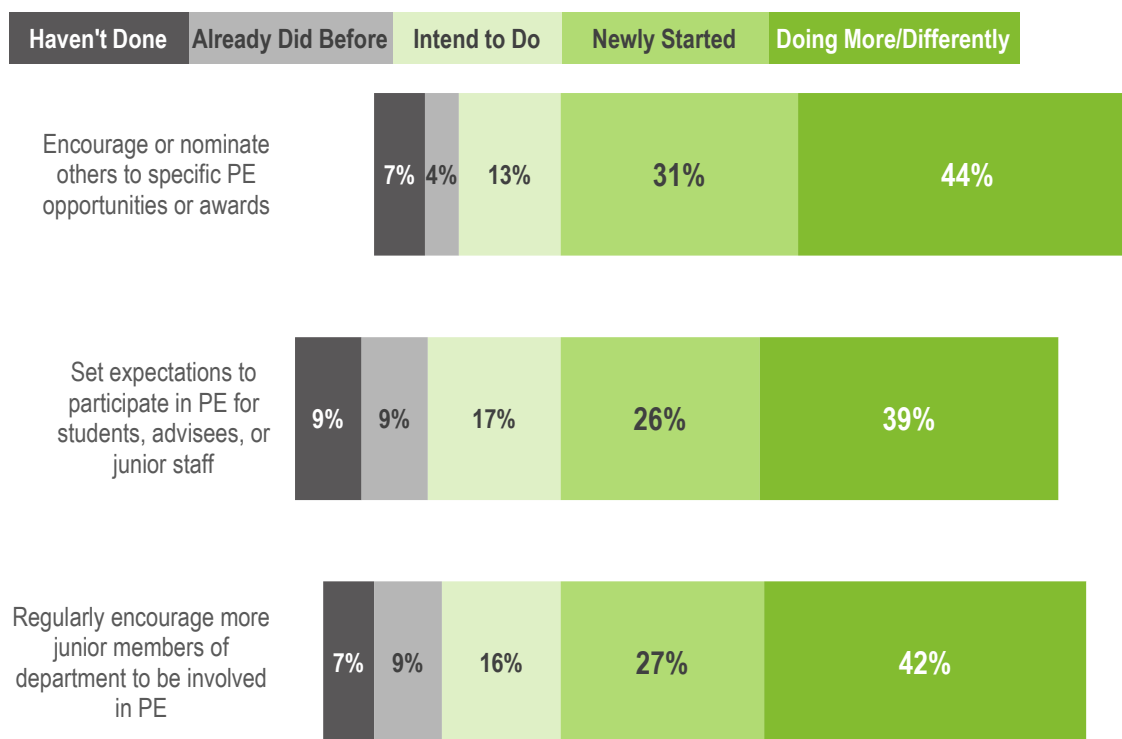
About 65% or more of Fellows reported they had made changes or expanded how they advocated for PE change by setting expectations and encouragement for those within their spheres of influence.

The qualitative phase of this evaluation revealed that, outside of advocating for institution-wide change for PE, Fellows are also able to be PE leaders within their roles as leaders of departments, labs, or faculty. In these roles, Fellows have the opportunity to set expectations, norms, and encourage PE involvement and quality for those they supervise – the next generation of scientists.

The quantitative data shown here reinforce that these are very common ways for Fellows to enact change in their practice – particularly to do this type of encouragement more often or in different ways than they had pre-Fellowship. While working at more of a micro- rather than macro-level, that these changes are critical for establishing new norms among emerging researchers and STEM professionals should not be understated.

Fellows' Experience Encouraging and Setting Expectations for PE (n=47).

Distributions of how many Fellows reported made specific changes in how the engaged in PE leadership with the students and colleagues they oversee. *Wording of statements has been slightly truncated for this graph.*



Results: Impacts toward Organizational Change

Making Change by Encouraging Others

In their descriptions of how they have incorporated expectations for PE into their work with students, junior faculty, and advisees, the passion about how they want to change norms in this bottom-up way is evident.

The quotations to the right share some examples of these types of changes and how Fellows are making strides to pave the way for others by supporting, encouraging, and expecting PE involvement of them.

Some interviews seemed to highlight that these were meaningful forms of PE leadership that Fellows could accomplish, even in contexts or situations where advocating for or achieving larger-scale institutional change is more difficult or slower-moving.

Combined with efforts for macro-level change (discussed on the next pages), this is part of a holistic vision of PE leadership for Fellows.

Descriptions from alumni, collected in interviews and survey responses, about specific examples of advocating for change by fostering a pro-PE environment among those they supervise.

"[PE is about] being personal and being a connecting point to these broader audiences. And I think that's something that I very much have been trying to communicate to students and when I talk about this or teach about it.

"[I try to teach my students that] there's going to be certain things that the community connects to, and that's great. And there's a lot of ways of being right. And as long as things aren't wrong, then it's fine." – Interview 2018 Cohort

"...Where it has unexpectedly helped me is in mentoring junior faculty, getting them to consider how PE fits in their work, especially during the grant writing process." – Survey 2020 Cohort

"I want from the people who come into my lab, I hope they learn that they have a responsibility with everybody. That doesn't have to do only with scientists, but also the general public, and they have to be engaged as much as they can. [That can be] either, as I tell them, at the community level up to the government level...So, I think that I definitely encourage everybody to speak up." – Interview 2017 Cohort

"After LLI, I now organize my research team to coordinate blog posts on a regular basis. It provides my students and postdocs the opportunity to also engage in PE as part of their education/ learning." – Survey 2019 Cohort

Results: Impacts toward Organizational Change

Advocating for Public Engagement

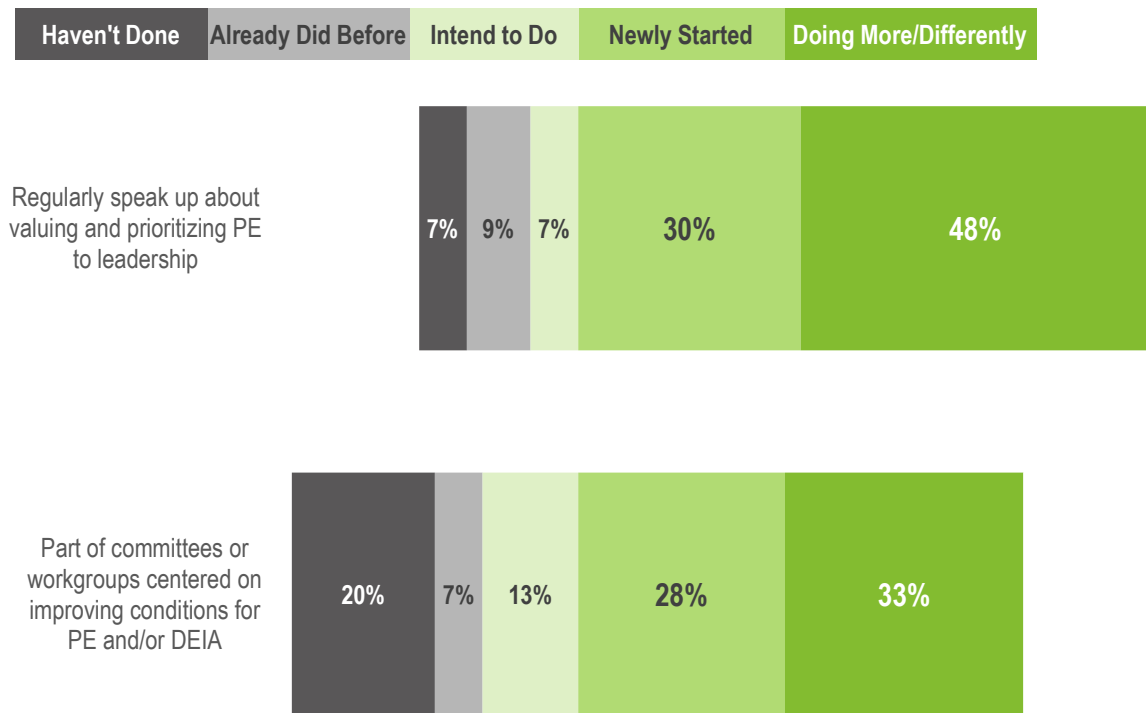
78% of responding Fellows reported that they have made changes in speaking up to organization leadership about the need to value and prioritize PE.

While this is a challenging goal for any PE leader, the survey results indicated that the vast majority of Fellows report they have made changes in their practice of these areas. A standout point is that about half of the Fellows reported they are speaking up to leadership more often or with different strategies, compared to before their LLI experience.

Relatively speaking, fewer Fellows reported that they had taken part in official committees, workgroups, or similar efforts to directly work on the problem of improving the environment for PE and inclusivity in STEM. It may be that this type of impact is a next-level achievement that requires some additional institutional buy-in before it can occur.

Fellows' Experience Advocating for Organizational Change toward PE (n=47).

Distributions of how many Fellows reported experienced changes in how they advocated for or engaged in leadership roles around PE in their institutions, during or after LLI. *Wording of statements has been slightly truncated.*



Results: Impacts toward Organizational Change

Opportunities to Advocate for PE

The types of organizational changes fostered by LLI are challenging to achieve, but several interviews described ways that they had achieved some progress.

At a very direct level, one Fellow described how they are taking a lead role in modifying the institution's process for tenure and advancement, with a charge to ensure that there is a more effective way of considering outreach and public engagement work in that process. Other Fellows talked about committee service and providing advice or recommendations about hiring practices to promote goals of engagement and inclusion in their institutions and related organizations.

Descriptions from alumni, collected in interviews and survey responses, about specific examples of advocating for change at an organizational level.

"I am currently serving as a **faculty fellow with the mandate to improve promotion and tenure processes at the college level**, including better means of evaluating outreach and engagement efforts on the part of faculty." – Survey 2018 Cohort

"It's been more the awareness and feeling of responsibility to kind of keep the efforts going. It provides incentive as well as you have that little voice in your head going like, well, people invested in you being on the front of these matters, so you need to step up. I think that's all very helpful." – Interview 2016 Cohort

"I'm now directing a research program where I have the ability, [working with a supportive director]... **We basically have been able to change the incentive structures of interdisciplinary scientists, to reward partnering community-engaged scholarship** to switch the focus from counting publications, to emphasizing impact and by impact really meaning, by our definition, changes in decisions and contributing to those kinds of larger societal changes that really turn the dial on climate change and sustainability." – Interview 2016 Cohort

Results: Impacts toward Organizational Change

Barriers to Organizational Change

Interviews occasionally emphasized barriers to achieving goals of organizational change, which were familiar to those who work with scientists in public engagement efforts.

Among these reflections, institutional resistance to change was perhaps the biggest threat to LLI participants' agendas and goals. These comments included a sense of frustration that an institution is "talking the talk, but not walking the walk" when it comes to PE. Others noted resistance from individual faculty or entrenched powers that make it feel like they are speaking up and trying, but don't see a lot of progress. In one extreme case, a Fellow concluded that they needed to change institutions – to a place with more buy-in for these ideas – in order to achieve the kind of change desired.

There were also comments that emphasized the need for more time to achieve these types of changes, as well as the variety of ways the COVID-19 pandemic has hindered efforts in general.

Descriptions from alumni, collected in interviews and survey responses, about barriers that Fellows encounter in their efforts to promote organizational change that have slowed or stood in the way of achieving as much as they'd like.

"There's a lot of people [in my institution] who are fairly old school. And by old school, I just mean that they pretty much feel that the audience that matters is only the sub-disciplinary audience within the program. ...**There's a number of faculty who don't feel it's a useful exercise for students or even other faculty to write papers for things that could be broader outside of the discipline.** So, they feel, if you're doing a very narrow degree in, say, plant physiology, you should only write for plant physiologists. You shouldn't try and do a broader impact. And they view it as a separate thing." – Interview 2018 Cohort

"I'm in a unique situation being a federal employee. Especially under the last administration [I was] very limited in the public engagement I have been able to do and the things I have been able to say. I have to speak in very specific places and ways that I think have limited my participation." – Interview 2017 Cohort

"[A barrier is] the amount of time that it takes... [Being in] the first cohort, they were like, 'We want you to basically create systemic change in the next 12 months.' And I was like... 'are you crazy? It doesn't happen that way.' And the only reason why **I feel like I've been able to do some of this [organizational change] work is because I've moved to an institution that supports and encourages this kind of work, and I've been able to be put into positions where I've had power and autonomy to make those decisions.**" – Interview 2016 Cohort

Results

**Impacts on Network
Development**

Results: Impacts on Network Development

Collaboration among Fellows

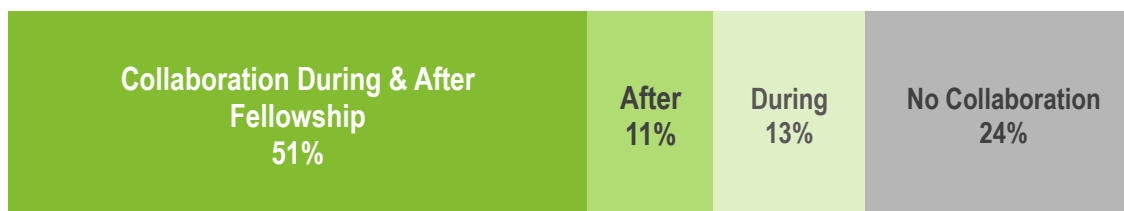
One direct outcome of the Fellowship is that the vast majority of Fellows - 75% overall – actively collaborate with one another on papers, projects, or other engagement work.

Even more notably, the data showed that over 60% of responding Fellows reported this collaboration occurred since their Fellowship year ended. This direct impact highlights that Fellows do not simply engage in the LLI experience for and by themselves, but see themselves as part of a professional network and actively engage and collaborate with one another.

This was an area where there were stark differences between cohorts. More members of the early cohorts have collaborated in the time since their Fellowship (72%) than those in the most recent cohorts (44%). This is likely primarily attributable to time – new cohorts have simply had less time post-Fellowship to collaborate. But it is also likely impacted by various limitations of the pandemic, which has been an issue throughout the post-Fellowship period for both of the last two cohorts.

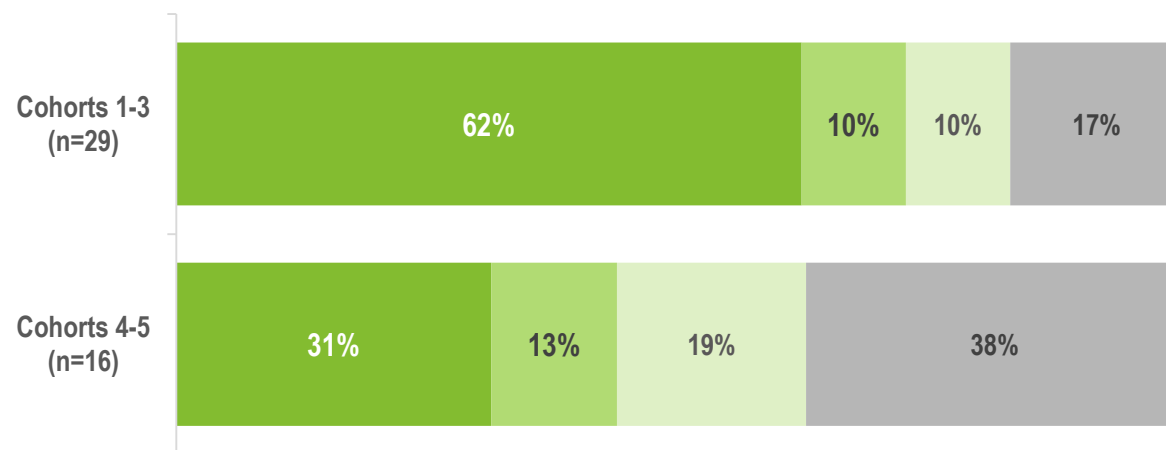
Overall rates of collaboration among Fellows during and/or following their Fellowship (n=45)

Fellows reported whether they had collaborated with other Fellows on any products – publications, conference sessions, grant proposals, PE events, site visits, etc. – during their Fellowship and/or in the time since then.



Rates of collaboration, comparing earlier and more recent cohorts

Note: Cohorts 4 & 5 were the two groups whose Fellowship experience was impacted by COVID-19 restrictions.



Results: Impacts on Network Development

Expanding Professional Networks

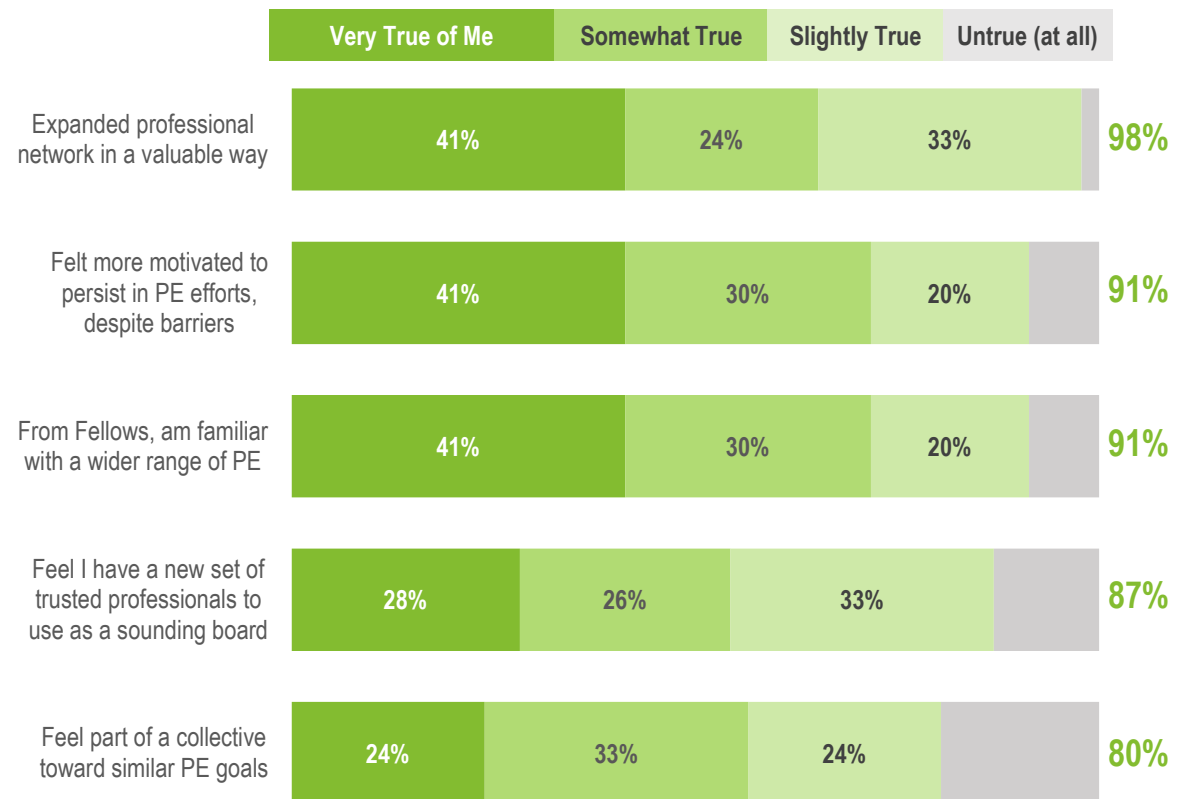
Impacts that arose from broadening Fellows' networks were some of the strongest results of involvement. LLI not only expanded individual networks, but the peer group gave Fellows more motivation to persist in PE and awareness of wider range of PE strategies.

All but one Fellow reported that at least one of the impacts on this list was true for them; with all five being true for the majority of Fellows. Beyond the foundational impact of valuably expanding one's professional network, **91% of Fellows felt more motivated to persist in PE, even when facing barriers, and became familiar with a wider range of PE** from their Fellows' activities and ideas. These strong outcomes emphasize the peer learning of LLI.

Almost as strongly rated were the final two items, which reflected broader outcomes. Over 80% of Fellows reported the group became a trusted sounding board for different kinds of professional issues, as well as simply feeling they were not alone, but part of a collective group advancing similar PE goals.

Fellows' experience of impact on the growth and support of a professional network

How many Fellows rated that each statement on being true for their experience with the LLI Fellowship. The number to the right (green) shows the total percentage of responding Fellows who indicated a statement was true for them.



Network Development Impacts

Results: Impacts on Network Development

The Value of an Expanded Network for PE

To some degree, the impacts around network development expressed different dimensions of “feeling less alone,” with a range of ways that relationships as a cohort helped to improve their PE.

In interviews and open-ended survey responses, Fellows articulated how they had benefited from collaborating with one another, and particularly how the expanded relationships led them to be more aware of PE strategies, be motivated by the examples and ideas of others, and to collectively give one another the motivation to persist through challenges and difficulties in prioritizing PE in their own work and institutions.

Descriptions from alumni, collected in interviews and survey responses, about specific examples of how the network has been critical to improving their PE practice.

“[There] are dangerous times when there is strong incentive to just, at any one particular time, let [PE] go. I won't bring it up here because I know it'll be a challenge, or it'll be a struggle to get through the conversation, but resisting that complacency is really important. The leadership program really helps out in that. You realize and appreciate that there's a cohort of like-minded folks out there working together, even though we're separate, but we're working toward the same goals.” – Interview 2016 Cohort

“I just finished co-writing a grant proposal with a Leshner fellow! The LLI gave me access to a new network of scientists with similar values and ways of working that I could collaborate with. I've also written articles and given presentations and workshops with other fellows.” – Survey 2018 Cohort

“I was very inspired by some of the work being done by other Fellows and found their feedback exceptionally helpful during the Fellowship year.” – Survey 2020 Cohort

“Seeing other scientists and professionals elevating science communication and public engagement as a critical piece of their work plan and their career really helped me to try and do the same, in a way that I hadn't been doing previously.” – Interview 2017 Cohort

Results: Impacts on Network Development

Other Values of an Expanded Network

Other dimensions that arose in interviews about the value of the networks developed within the peer cohorts included a feeling of the sense of being part of a collective and having a trusted sounding board.

The quotations from Fellows to the right highlight ways that the cohorts provided even broader values, including the sense for some that they were part of a larger collective working toward similar goals. That aspect of feeling less alone in their efforts seemed to be quite important.

Another aspect was the creation of a trusted group of peers to celebrate one's successes as well as to be a sounding board and advisors on whatever arose in their careers and PE efforts.

It is worth noting that, in the survey responses, several Fellows noted that while they've appreciated the peer group support, there has been less active collaboration than they would have liked. This may be an area that would benefit from greater support, structure, or encouragement in the future.

Descriptions from alumni, collected in interviews and survey responses, about specific examples of how they have benefited from having a broader peer network.

"I had built-in collaborators, I had built-in cheerleaders, I had folks who were working towards similar goals and experiencing similar or different challenges where we could work together and support each other...
The community and the network, I think when you think about that, again, it's this, we-over-me mentality." – Interview 2016 Cohort

"There have been a couple of situations where some members of the cohort, including me, have been recruited either internally or externally for positions that would involve more of this engagement stuff. So, whether it's leading a Center, whether it's leading a department, whether it's starting up a new initiative – [you have to] make those decisions, like, 'Is this something I pursue or not?' Just having people who are on the same page to talk through those things, who are outside your institution [is a benefit]." – Interview 2016 Cohort

"Honestly, the biggest benefit to me was having more contact with the cohort that I was with. I knew many of them superficially, ...but that's actually probably the biggest, lasting benefit of it. More than any of the individual trainings.... [is] closer ties with this cohort. That's probably the thing that's going to last much more than anything else." – Interview 2020 Cohort

"We share in each others' successes but there has been less collaboration than I had hoped." – Survey 2017 Cohort

Results

**Critical Attributes & Value
of LLI**

Results: Critical Attributes & Value

How LLI Creates the Greatest Value for Alumni

Fellows value many of the benefits created by LLI. In the aggregate, the two greatest values appeared to be that it creates a network of peers who “get” PE work and it enables more strategic PE activities.

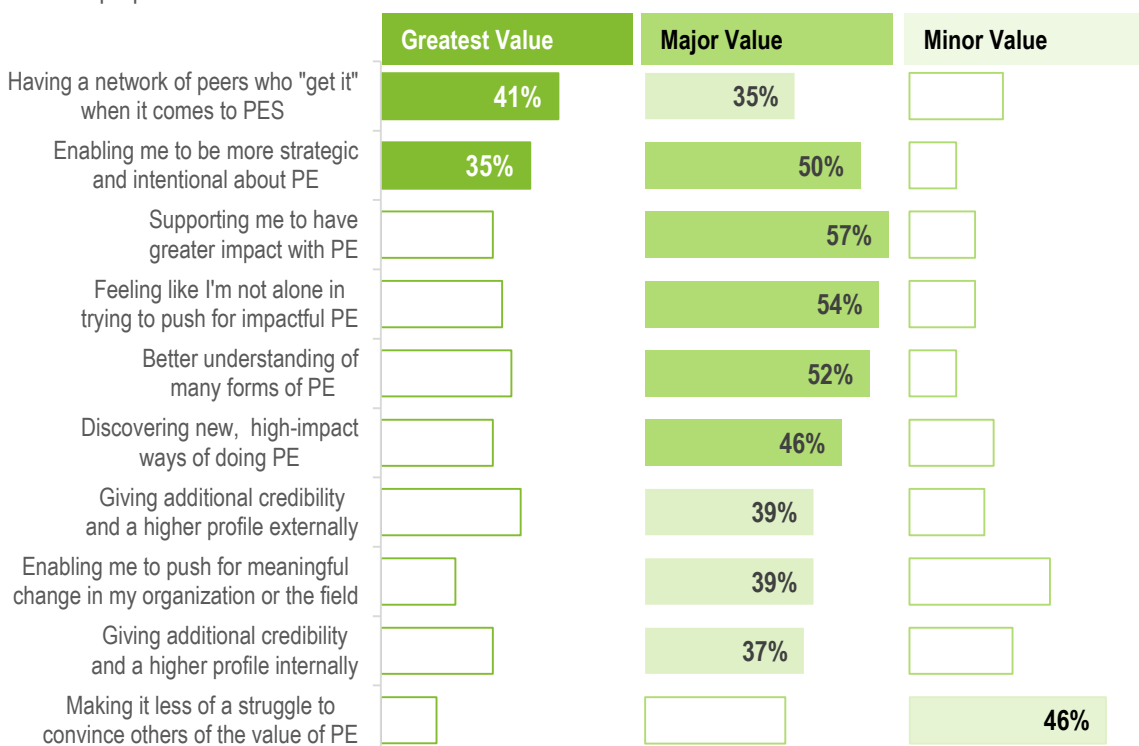
Selections of value varied, but there were “clusters” of program benefits that tended to be selected as the greatest value, a major value, or a minor value of LLI. This graphic shows where one-third or more of Fellows placed a benefit.

The network and training on strategic PE rose to the top of the value of LLI. This was followed by a cluster of benefits that related to these, each emphasizing learning how to be more effective at PE and feeling less alone in that effort.

There was less consensus about how much Fellows valued organizational change support. This indicates that the less direct the benefit to the individual, the more variable whether it is as valued. As the lowest rated item suggests, it may also reflect that these benefits are still a struggle, due to external factors of moving the needle on organization change, which even LLI’s support cannot fully eliminate.

The Benefits that Past Fellows Would Say Were of Greatest Value (n=46)

“If talking to another researcher considering LLI, what would you say was most valuable about involvement?” Value labels show where more than one-third of Fellows gave the same rating to a statement. Outlines without values show the relative proportion of Fellows who rated a statement at the other value levels.*



*Each item was rated as either Greatest, Major, Minor, or Not a Value of LLI. No statement received more than 6 selections as “not a value” (and is not visualized here).

Results: Critical Attributes & Value

Alumni Describe the Value of LLI

Excerpts from interviews with Fellows describing the greatest value that LLI provided to them professionally.

“AAAS is so respected that by being a fellow, people take you seriously. And so, the idea of going into a Dean's office and saying, ‘Well, we should try... Can we run this extra class?’ Or going into a department head going into a Dean's office, applying for a grant saying, ‘Well, we're working with AAAS,’ all of the sudden it gives you that opportunity to play and explore. Where before you're not taken seriously because well, why would you be doing that?”

“**Now you have this opportunity to be taken seriously, and you can start.** So, there's one, you get instant credibility. The second is, you get **instant credibility with a wide network, with a wide set of expertise that now you can tap into whenever you need to do something.**” – Interview 2018 Cohort

“**Reinforcement of the impact of science policy language and knowing your audience for your public engagement.**...They gave us a lot of training on knowing who we were speaking to and making the most appropriate messaging methods... Your message is the same throughout, but how you present that information may change based on the audience and communication methods that you are using.” – Interview 2019 Cohort

“I think we benefit from hearing what other people are doing, ideas that they have for taking these approaches and seeing synergies. ...It's just been really valuable to **get ideas from where people are taking their public engagement activities**, how we could mirror some of those activities in the work that we're doing within our own organization here. And again, just **seeing the value that it adds and what they're able to accomplish gives you a lot more energy to try and replicate** some of those same things in my own organization.” – Interview 2017 Cohort

“The ability to interact with the cohort is the number one benefit. ...I'm actually doing things collaboratively with a few of them now. ...[And] I could think about the ideas and how to build upon it with what I heard from the AAAS and the Congress visit and things like that. I think **I've really benefited from knowing the cohorts better and the discussions we had.** So that would be my single biggest benefit. The second one would be knowing the AAAS itself better. **I did not know AAAS and all the resources that it offers.**” – Interview 2020 Cohort

Results: Critical Attributes & Value

Cohorts' Differences in Perceived Value

Fellows from early cohorts were much more likely to see strong value of LLI around building professional credibility, profile, and ability to convince others of the value of PE.

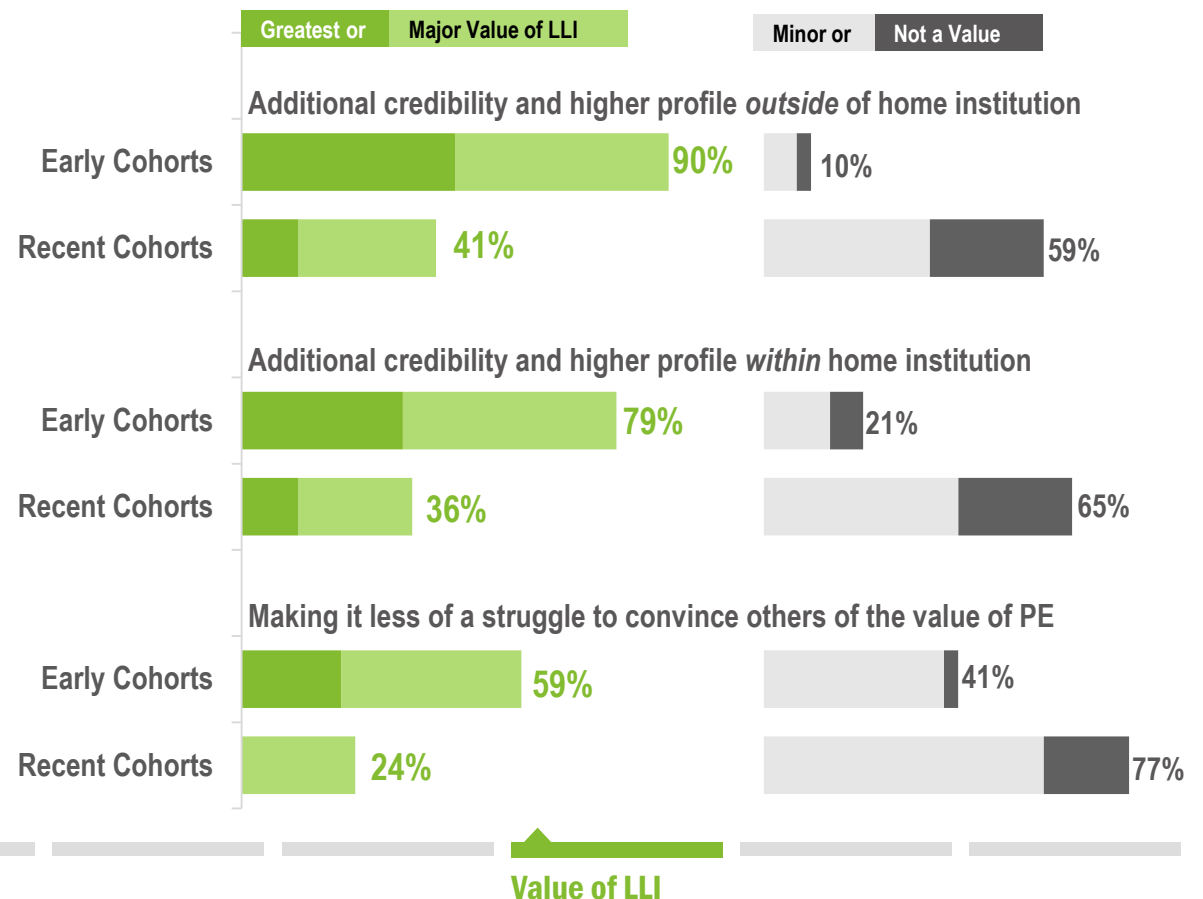
In fact, Fellows from the early cohorts tended to rate all of the value statements significantly higher. On average, early Fellows gave an overall rating at the "Major Value" level; recent Fellows' overall average was a half-point lower, between "Major" and "Minor" value.

The differences were significant and dramatic on a few items, which underscore that it may take more time for Fellows to experience or perceive value of the program toward their credibility and profile, or to see results that it is easier to convince others to invest in PE.

Alternatively, it could be influenced by subject matter (recent cohorts were more technology-centered) and/or the impacts of COVID, which have impacted institutional dynamics and priorities in academia, government, and industry, potentially creating new or unusual barriers to realizing external values.

Early cohorts tended to see greater value in LLI for helping with PE leadership & credibility.

Comparing the ratings of value statements between Early Cohorts (1-3, n=25) and Recent Cohorts (4-5, n=14); based on **rating as great/major value of LLI**, compared with ratings of minor/not a value of the program.



Results: Critical Attributes & Value

Attributes of LLI that Create Impact

The Leshner Leadership Institute creates its value through an integrated set of attributes that work together to create a system that supports and influences the PE and career trajectories of Fellows.

In the interview phase, Fellows were quick to identify the specific attributes and qualities of LLI that make it special and what they feel generate impacts and value described throughout this report.

A few broad themes were heard in almost every interview, including: the connected peer group, AAAS' reputation and prestige, and the intensity of involvement during the year (particularly for pre-COVID years).

Looking across the data in this evaluation, it seems that this program design – combining carefully selected cohorts, providing them strategic training and support, engaging them in an intense and lengthy learning-through-doing process, and backing it with AAAS' prestige and reputation – seems to create a “secret sauce” that leads to the impacts discussed in earlier sections.

Emergent Themes from LLI Interviews about What Qualities of LLI Generated the Impact



Peer Group: Like-minded on PE

LLI brings together a cohort of peers who have a shared value, interest, participation, and/or desire to improve in public engagement work.



Peer Group: Issue-Focused

LLI brings together a peer cohort from related, but not homogenous, fields, giving a shared foundation of needs and issues in the work and different perspectives within it.



At Career Inflection Points

LLI often brings in Fellows who are at a mid-career stage that is an ideal moment to influence their PE leadership and career trajectories. Neither early career, nor entrenched.



AAAS' Reputation & Prestige

LLI is backed by the strong AAAS reputation in the scientific community, which confers immediate prestige, cachet, and influence that can “open doors” in various ways.



Training Design & Focus

LLI's intensive on-site training feels distinctively relevant and applicable to Fellows. Learning-by-doing, learning from experts, and applying to plans is more actionable than typical trainings.



Support from AAAS Staff

LLI's program staff, and sometimes others at AAAS, provide strong support and are extremely accessible. LLI also provides opportunities initiated by AAAS, beyond the core training.



Length & Intensity of Involvement

LLI's structure and expectations, including the week-long intensive training, the in-person time to bond within a cohort, meetings throughout the year, and systems for accountability pushes them to apply learning.

Results

**Indicators of Public
Response**

Results: Indicators of Public Response

Considering Fellows' Effectiveness

The impact on public audiences is the ultimate vision of how LLI contributes to the world. All of these impacts on researchers as engagement professionals and leaders is in service of a broader, more engaged, and more listened-to public.

Given the diversity of the Fellows' expertise, contexts, formats of public engagement, target audiences, and engagement goals, measuring a Fellow's effectiveness with audiences is a substantial challenge that was beyond the scope of this retrospective study. It is difficult to imagine a single, cross-cutting measure of effectiveness that spans the variation of the Fellows' engagement work.

However, in this study, we explored for emergent evidence of common indicators of effectiveness with public audiences, specifically, indicators that were something a scientist doing engagement might be able to notice or attend to – to get a sense of whether they are seeing progress. This happened in two phases.

In the interviews, we asked a series of questions to have alumni describe and recall what they had seen, heard, or noticed in audiences' response to them as they improved their PE skills. We then put some of the themes heard in those interviews in front of Fellows in the broad survey – to gauge whether or how strongly they had noticed these things in their audiences' responses (on the next page). While these are not definitive indicators, they could be a starting point for helping Fellows and AAAS reflect and articulate what individuals and the collective PE community mean by “effectiveness” and whether there are cross-cutting indicators of that.

“Right before this [interview], I was giving a town hall on vaccines and in the [Zoom] chat I had just these amazing comments...For instance, one of them said **'You just have a way with words that just makes us feel safer and more comfortable, and we feel so honored to have your time.'** Or I get emails from folks saying, 'I was so terrified to go to work.' or 'I just have been crippled through this [pandemic] and you just gave me hope and confidence.' – Interview 2017 Cohort

“From a social media perspective, my account rarely got retweets or anything. If I got a retweet it would be maybe someone that worked for me, it was not super impactful. But now **I've increased the number of followers that I have on Twitter. The company, I've found, has also increased the number of followers substantially on Twitter. The content that we've generated from the webinars has achieved a lot of impressions on Twitter as well.**” – Interview 2020 Cohort

Results: Indicators of Public Response

Indicators of Effectiveness in Public Response

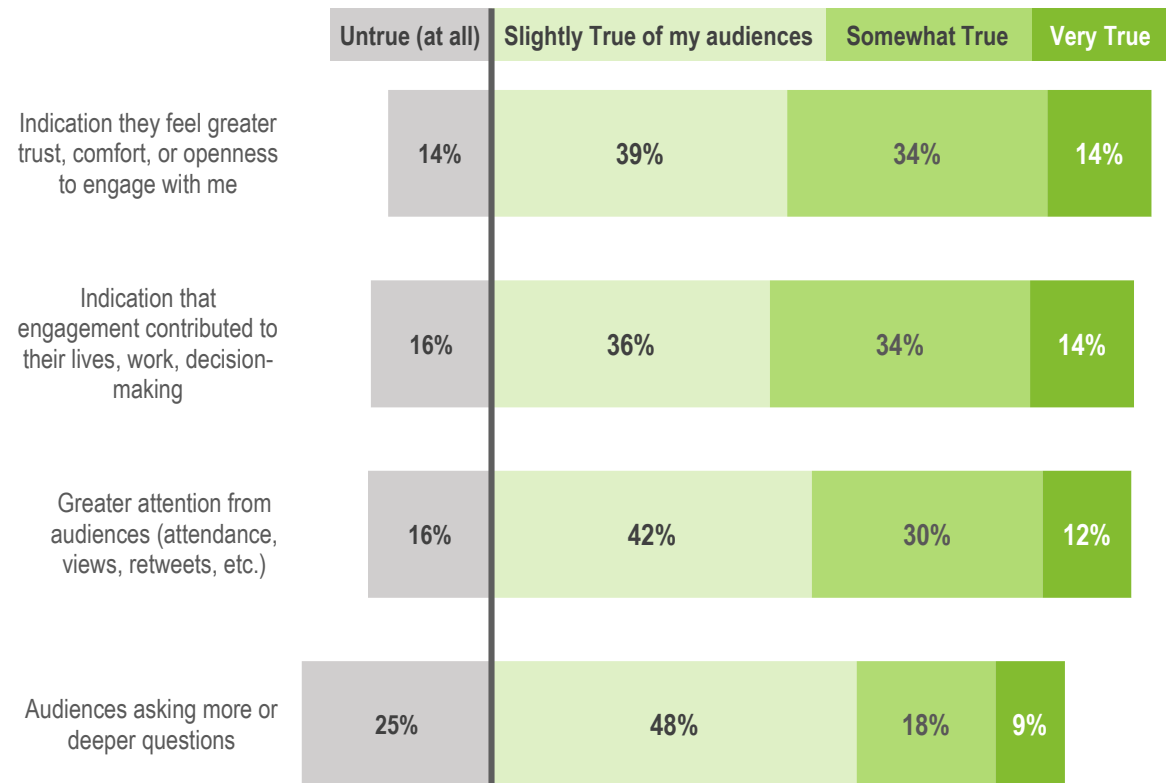
When reflecting on their public audiences, Fellows felt they had noticed these indicators of effectiveness happening, but were not extremely confident about how often or strongly that happened.

Three indicators of effectiveness seemed to be equally common and similarly perceived in Fellows' observations of their audiences. One was noting indications that the audience feeling greater trust, comfort, or openness to engaging with the researcher. Another was having seen indications that the engagement directly added to the audience's professional or personal life or decision-making. The third was noticing greater audience attention to engagement, whether through attendance at live events or views, retweets, likes, or similar of online engagement.

The indicator of effectiveness that seemed to have been slightly less noticed by Fellows was audiences asking more or deeper questions in response to the engagement. But this was only slightly weaker than the other items.

Fellows' observations of ways audiences have responded differently to their engagement

Fellows were asked to think about when they have done PE work since starting LLI and whether they noticed any of these indicators of changed audience response to their modified engagement style. (n=43-44, depending on item)



Results: Indicators of Public Response

Indicators of Mutual Understanding by Fellows

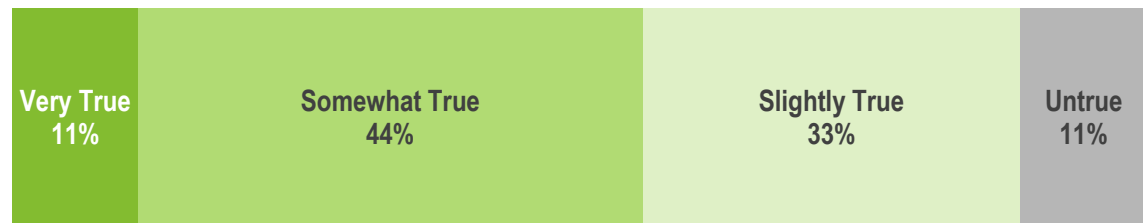
89% of Fellows felt that it was true that they had come to feel much more aware of their audiences' needs, priorities, and ways of intersecting with their research or work during or after LLI.

Even more than indicators of audiences' response to their new styles of engagement, Fellows were also able to reflect on the degree to which their sense of awareness of their audiences' perspectives has been changed from involvement. To some degree, this has been true for nearly every Fellow responding.

It's worth noting that the phrasing of the question emphasized a strong outcome – feeling *much* more aware of audience perspectives. The purpose was to push Fellows to reflect on the extent of the change they experienced, rather than simply checking strong agreement, which may contribute to the distribution of levels of how true that statement felt for Fellows. In addition, interviews revealed that some researchers already felt aware of their audiences prior to LLI, so may have seen this as less strong of a shift due to their incoming point of reference.

Fellows' sense of feeling much more aware of audience needs and priorities (n=45)

Respondents rated how true they felt it was of them that felt much more aware of audiences' needs, priorities, and intersections with their research/work.



Conclusions

Implications of Results

Conclusions

Discussion: Key Insights from this Study

LLI has successfully impacted Fellows in ways that extend beyond the Fellowship year to have lasting impact on their careers.

LLI has an impact on Fellows in each of the key areas it intends – public engagement (PE) work and leadership. Moreover, that impact lasts beyond the year of the Fellowship, and appears, in many cases, to influence the career and leadership trajectories of participants.

Specifically, sustained impact includes Fellows doing more and more intentional PE work in ways that do not detract from their research responsibilities. They experience a higher profile within their institutions, and the majority even report that the Fellowship contributed to their career advancement. Most centrally to LLI's mission is that Fellows become and remain a voice advocating for public engagement.

Looking across the data in this study, it seems evident that LLI's impact derives from a system of experiences, skill-building, relationships, and prestige that come at a critical career stage for a like-minded group of researchers working on a shared sphere of issues. This mix appears to enable, motivate, and support most Fellows to progress in desired directions.

LLI leads Fellows to do more PE work, try new forms, find their “niche,” and integrate public engagement with their research.

In their PE work, Fellows talked about the value of the hands-on trainings and peer-learning during the initial week-long experience at AAAS. The evaluation indicates that this led to tangible change in PE practices – the vast majority try new formats, and some continue to use those new formats. But, most crucially, changes in PE practice aren't only about doing something new; rather, there is greater intentionality to PE. Over time, many Fellows find their “PE niche,” the right format(s) and strategies for their goals.

In this vein, it was encouraging that most Fellows report spending more time on PE, and that many report finding ways to integrate it within their research. This is a critical mix, as the program's goal is not to shift researchers into communications professionals; LLI wants researchers who continue with their critical work in science and technology, but who have the skills and mindsets to integrate engagement with the public into their research priorities. The evidence suggests that for many, this is a success of LLI.

Fellows have demonstrated many ways of being a leader who advocates for PE and experiences career advancement.

Fellows will be among the first to acknowledge that achieving institutional change is extremely difficult and takes more than one year. But the data indicate that Fellows, on the whole, remain motivated to advocate and be a voice for change in their organizations. One of the strongest responses of how LLI changed their leadership behavior was about regularly advocating for PE to institutional leaders. This is what a Fellow can most control – their actions; but it is important that, even facing entrenched mindsets, there is a commitment to this internal advocacy work, which is also not reserved for special committee service but is part of being a day-to-day leader.

Related to this, the data showing that LLI has contributed to career advancement and raised the profile of Fellows within their organizations can be viewed as a tangible indication that investment in PE is not detrimental to research careers (as some entrenched conventional wisdom might assert). Rather, LLI is an example of how, implemented strategically, investment in PE can support a long-term career benefit.

Conclusions: Opportunities Going Forward

There may be opportunities to help more researchers think about how PE can play a role in informing their research directions.

Not surprisingly, the study found that fewer Fellows reported that their PE work directly shaped or informed their research work, compared with the number who felt they'd been able to integrate PE with their research efforts. The latter is more about balancing time, which is also important, rather than directly shaping research. There was a clear pattern that those who reported using PE to shape research were from earlier cohorts; and based on qualitative data, this seems to be influenced by *what* a researcher's emphasis is. Those working to influence climate policy or public health more easily found ways for PE to shape their work, given their prior focus on relevance to publics.

An opportunity for LLI in its next phases could be to more explicitly support and train researchers where those connections or uses of PE are less obvious. There may be ways to take examples from early success stories and help others think about ways that public engagement and input could productively advance their research or goals around the impact of their work.

The themes from this evaluation could offer a concrete "idea bank" to help new Fellows envision what PE leadership can look like.

The idea of driving institutional change around PE is quite broad and may, for some, seem a bit overwhelming. One result of this evaluation was arriving at an inventory of concrete ways in which Fellows can and do make strides toward institutional change. This list may be a starting point for new Fellows to think about how they can tangibly make strides even without (or before) administrations making institution-wide change. From setting expectations for advisees, staff, and students to coaching colleagues so that they can experience the value of doing more effective PE, Fellows have shown a wide range of ways to change culture and norms around PE.

In addition to the examples and ideas revealed in this evaluation, the data also pointed to how critical the network development within a cohort is for mutual inspiration and motivation. Much of that derives from exposure to others' ideas, examples, and models of operationalizing being a PE leader within the daily responsibilities of a researcher. The role of cross-pollination in LLI's design is an important aspect to maintain.

The network created within the cohorts of Fellows is at the root of much of the impact and value that is experienced.

Extremely often in interviews, when alumni were asked what was most valuable about LLI, the comments began and ended with "our cohort." There was something critically important about the nature of the new relationships built in those like-minded, similarly-disciplined cohorts, which spurred a range of the later outcomes that emerged. In addition to the sharing of ideas and strategies, the group became – for some – a trusted group of colleagues to go to for advice in a wide range of career situations. From advice about the tenure process to input on a new career opportunity to actively collaborating with one another, some Fellows leveraged this group.

While there may be new affordances in having groups of Fellows from a single institution working together – an idea being considered – this study seemed to indicate that there is also value from connecting Fellows with new views and institutional perspectives to broaden their networks and their view of what might be possible – for their institutions or for themselves.

Lasting Impacts of LLI: Retrospective Evaluation Report

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