The Ralph C. Wilson Jr. Foundation

STEM19

January 2021

Submitted By:
Chelsea BaileyShea
COMPASS
EVALUATION + CONSULTING LLC

Introduction

In spring 2019, the Ralph C. Wilson Jr. Foundation anticipated awarding up to 20 grants to organizations providing out-of-school (OST) STEM programming in Southeast Michigan (SEMI) and Western New York (WNY). The initiative was called STEM2035. STEM2035 grantees would take part in a peer learning community (PLC), receive training and technical assistance from the PEAR Institute at Harvard, and be given up to $250,000 total over three years to support their proposals.

When reviewing the grant applications, Foundation staff identified organizations that had creative and interesting proposals, but not necessarily the current infrastructure or design to meet STEM2035 requirements. The STEM19 initiative offered smaller, one-year grants to these organizations. STEM19 grantees were given between $50,000 to $100,000 total over 12 months, virtual technical assistance from PEAR, an overview of PEAR's capacity building tools, and asked to participate in data collection. STEM19 funding ran from January 2019 to January 2020.

Evaluation Guiding Questions

- *To what extent was the quality of the STEM-19 OST programs strengthened through their participation in the STEM19 grant?*
- *To what extent did the STEM-19 grants improve after school organizations' capacity to serve traditionally underrepresented youth in the two metropolitan regions?*

Data sources

The data used to support the lessons learned included in this report came from a number of sources.

- Focus group summaries from Equal Measure (initial and endline)
- PEAR dashboard data
- PEAR STEM19 report
- STEM19 grant applications
- STEM19 grant reports (interim and final)
- Interviews with Foundation staff, select PEAR Institute staff and one grantee

6 ORGANIZATIONS IN ***Southeast MI***

15 ORGANIZATIONS IN ***Western NY***

20 organizations providing OST STEM programming to youth were selected. 15 served youth in Western NY and 6 served youth in Southeast MI. **One organization served youth in both regions.**

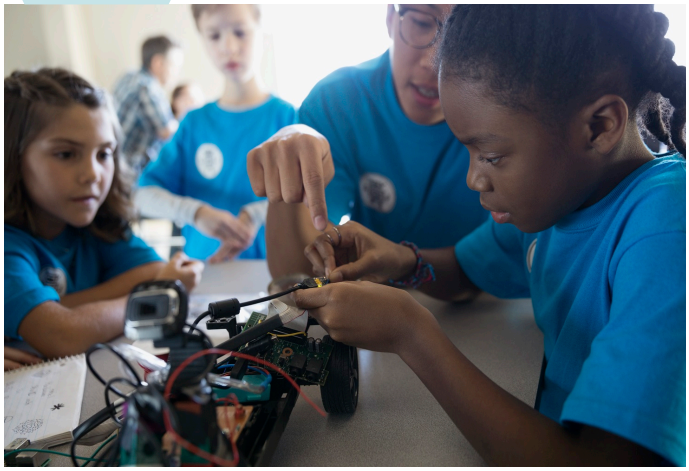
18/20 *grantees given $50,000 total*

2/20 *grantees given $100,000 total*

Initially, 20 grants were awarded. 18 grantees received $50,000 in total. 2 grantees, Salamanca City Central School District and Buffalo Academy of Science Charter School, received an additional $50,000, equaling $100,000 in total, for necessary capital costs.

Ultimately, **18 grantees** accepted funding and support over one year.

One organization, Community Action Organization of Western New York, Inc., withdrew prior to receiving any funding. Another grantee, Project Tinker, returned the funds and withdrew before the end of the initiative.



Benefits of participating in STEM19

Overall, data indicate that organizations' participation in the STEM19 initiative supported both the goals of strengthening the quality of their STEM programming and improving their capacity to serve traditionally underrepresented youth. In particular, the opportunities offered to STEM19 grantees provided them with an overview of tools and frameworks they could use to look at their work more critically and refine their current programming.

Participation allowed some organizations to **enhance the content and quality of their STEM programming** by:

- Expanding knowledge of what STEM/STEAM are—*one participant shared that prior to participation in the grant, they focused only on the "technology" aspect of STEM*
- Deepening their understanding of best practices in OST STEM programming
- Improving the quality of the content they deliver with the use of data

Participation allowed some organizations to **expand their capacity to serve youth** by:

- Expanding outreach and developing additional sites
- Increasing the number of staff and improving staff to student ratios
- Increasing the availability of OST STEM opportunities (i.e., allowing STEM programs to extend into the summer or beyond the academic year)
- Removing transportation as a barrier (while funded)
- Building partnerships with local universities and businesses to add other program offerings (e.g., robotics)

Participation supported **growth in internal capacity** (e.g., knowledge and skills sets)

For example, in a focus group, one grantee spoke about the value it brought to their organization's grant writer's skills:

> *"…The logic behind [the PEAR] approach and the way that we do our work is very aligned. And just being able to hear someone else talk about it, I think has helped [our grant writer] to sharpen his language."*

Examples of what Funding was spent on:

"We have 7 different schools represented. [Funding] really allowed us to do that."

"Without transportation the best program in the world is simply not reachable."

Benefits of Working with Pear

> *"About two years ago, we built out a social-emotional…supplement… And we've been, I would say not struggling, but … we're early in the process of figuring out how to richly evaluate that. So, just as a first pass, getting to be able to see what the system generated …, just being able to get a first read on all of that was really valuable."*
>
> *FG participant, endline*

Working with PEAR provided participants with a number of benefits. This included:

1. **Enhancing individuals' communication skills**—having a research-based, tested tool provided a common language for those exposed to it

2. **Helping organizations measure program quality** and focus programmatic improvement using data

3. **Providing participants with a framework** that helped illuminate areas of strength and areas in need of improvement

> *"I think the DoS itself and the categories that are in it helped us focus, and we're really quite pleased with the results we got for just this first year."*
>
> *FG participant, endline*

4. For those who submitted a DoS observation video, they **received concrete feedback** from PEAR experts about ways to improve their specific programming

Data Collection with PEAR Tools

Grantees were invited to participate in two rounds of data collection. The first round took place in the summer of 2019 and the second in the fall of 2019. The PEAR tools included:

- Program quality observations using the Dimensions of Success **(DoS)** tool
- Student ratings from the Common Instrument Suite for Students **(CIS-S)**
- Educator ratings from the Common Instrument Suite for Educators **(CIS-E)**

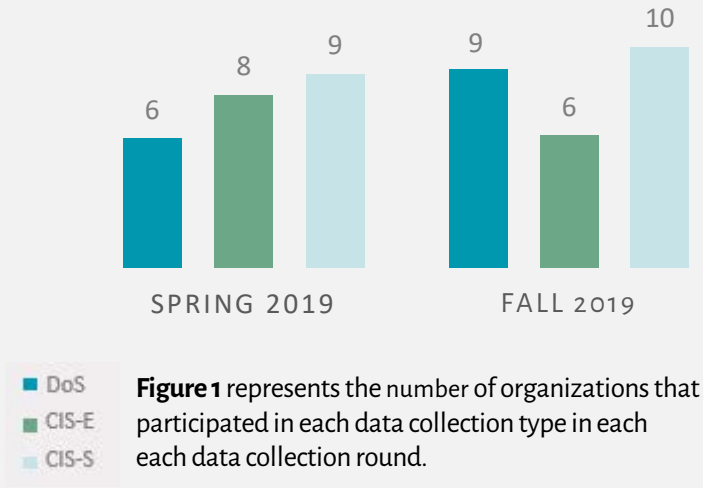


Figure 1 represents the number of organizations that participated in each data collection type in each each data collection round.

Program Participation

12 out of 19 programs participated in data collection

- 3 grantees did not collect any data
- 3 collected both summer fall **CIS-E** data
- 8 collected either summer or fall **CIS-E** only
- 4 collected both summer and fall **CIS-S** data
- 11 collected summer or fall **CIS-S** only
- 3 sent in both summer and fall **DoS** observations

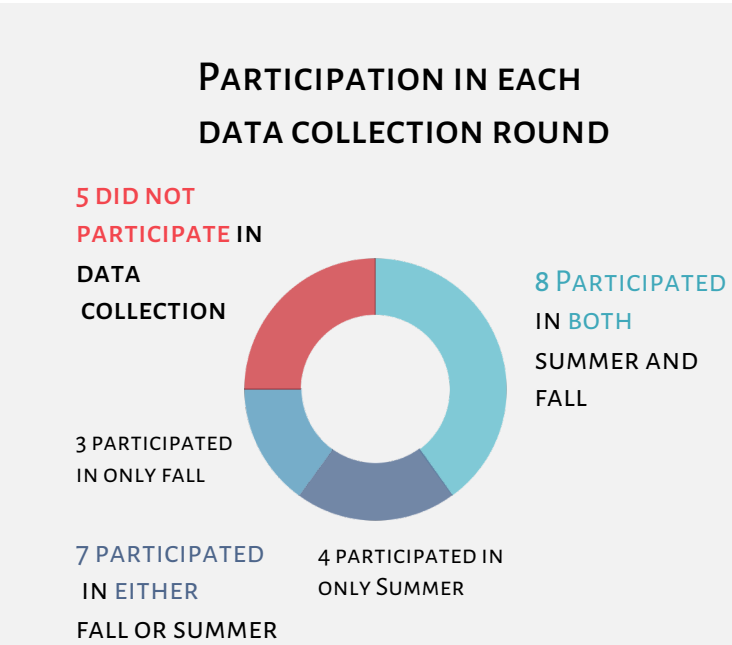


Figure 2 represents the number of organizations that participated in summer and fall, summer or fall, or no data collection rounds.

The main reason some programs did not participate student or educator data collection was due to their program timing not aligning with data collection timing (e.g., their program was a summer program only and data was being collected in the spring)

How did STEM programming impact youth?

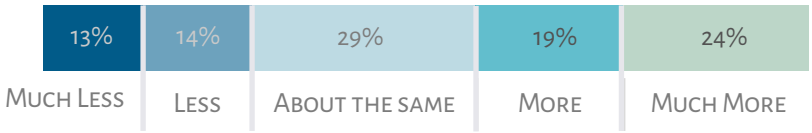
The program theory of change had three desired short-term and intermediate outcomes for participating youth: **increase engagement in active learning experiences; increase interest in STEM activities, courses, and careers; and increase socio-emotional learning through program activities.** **CIS-S data indicated positive trends in achieving these goals.**

Overall, STEM19 youth data indicated that STEM programming had the **most positive impact** on **engagement in STEM** and the four **social-emotional scales** (*critical thinking, perseverance, relationships with adults and relationships with peers*). STEM19 youth reported the least amount of growth in STEM identity and participation in STEM activities. These data suggest that programs could benefit from support targeted at helping youth understand the ways in which STEM is a part of their world and everyday lives. **In comparison to a national norms sample, youth participating in STEM19 programs reported greater positive change across 7 of the 10 CIS-S scales.**

CIS-S Results

Almost half of STEM19 youth respondents (43%) indicated increased **interest in having a STEM job in the future.**

Figure 3. "I would like to have a STEM job in the future." Student responses ranged from 1 (much less) to 5 (much more).



CIS-S data indicated an increase in socio-emotional learning through program activities

STEM19 participants showed a positive change in four 21st century skills: critical thinking (85%), perseverance (83%), relationships with peers (77%), and relationships with adults (77%). Across all four of these domains, participants scored higher, on average, in comparison to national averages.

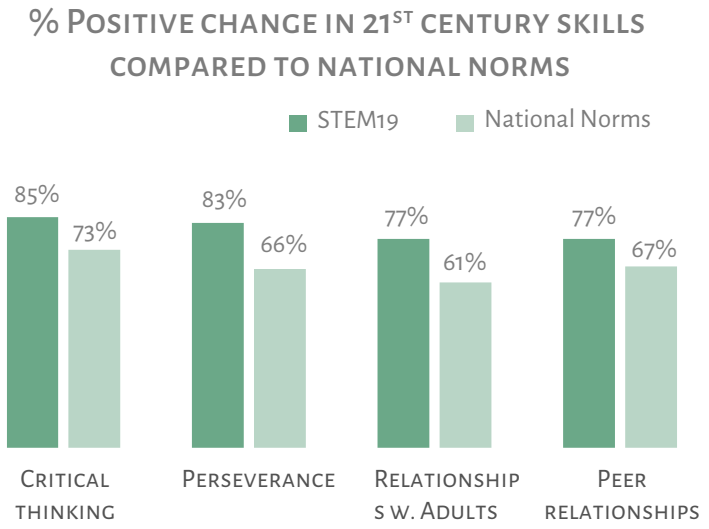


Figure 4.

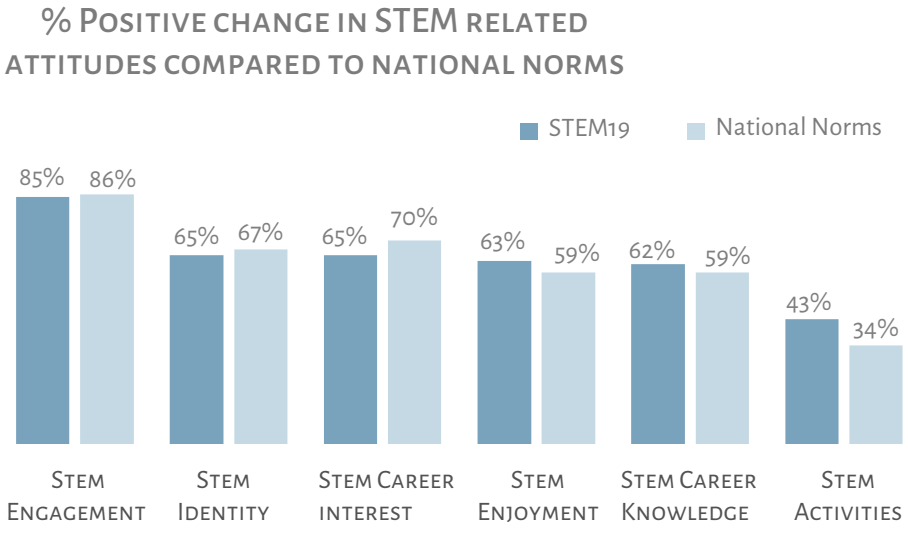


Figure 5.

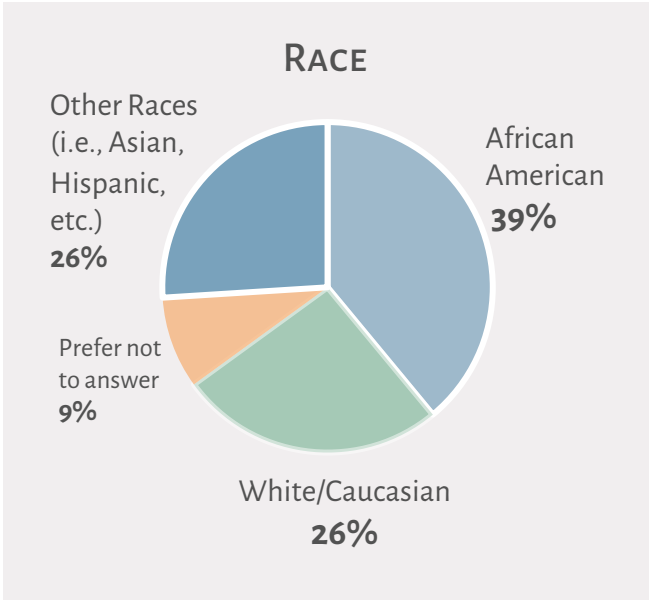
STEM19 youth reported the **least positive change** in participation in STEM activities outside of programming (43%), STEM identity (62%), and knowledge of STEM careers (63%). In comparison to national averages, STEM19 youth scored higher in: *STEM enjoyment, STEM career knowledge and STEM activities*).

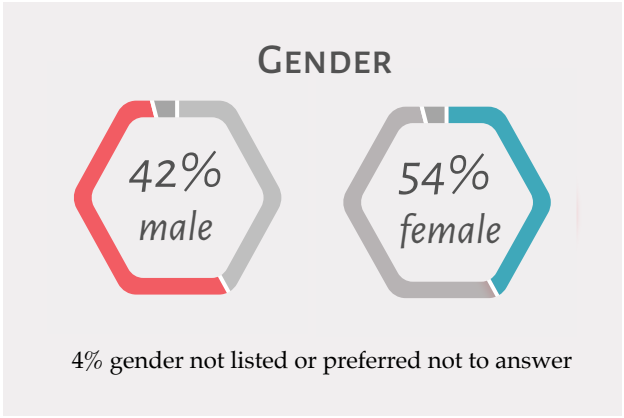
Demographics

Youth Participants

15 programs serving 647youth in grades K-12 **participated in data collection** between April 2019 and January 2020.

STEM19 youth participants were racially diverse; 65% of youth identified as being African-American, Multi-racial, Hispanic, Asian, Native-American or Alaskan Native.





Youth Who Speak a Different Language than English at Home

PEAR's data analysis indicated that for STEM19 youth who speak a language at home other than English (LOTES) (*n*=129), more positive change was reported in their interest in STEM careers (84%), knowledge of STEM careers (81%), and enjoyment of STEM (82%), in comparison to the entire sample of youth. This highlights the value of disaggregating data to examine where, if at all, differences exist between groups of learners.

Gender Differences

PEAR's data analysis also revealed differences in outcomes for STEM19 girls (*n*=343) and boys (*n*=270). On average, girls participating in STEM19 programs reported greater negative change in STEM career interest (26%) and STEM identity (24%) when compared to boys' interest in STEM careers (18%) and identity (22%).

4 out of 5

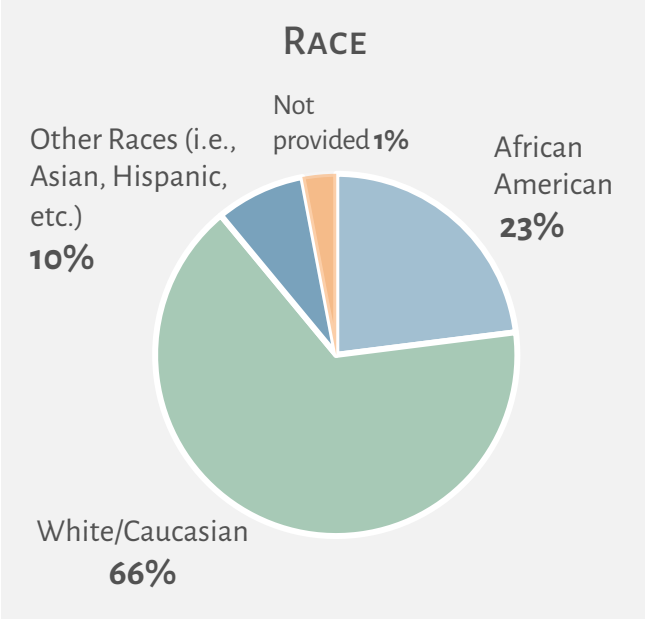
STEM19 children reported that they had been **involved** in STEM programming for **at least four to seven weeks**.

4 out 5

STEM19 youth also reported at least **one to three hours of STEM involvement per week**.

Educator Participation

49 educators from 11 programs
participated in data collection



Educator Attitudes Toward Teaching STEM Over Time

Staff respondents showed **increases in agreement across all categories** related to their comfort, confidence, capableness, and interest in leading STEM. The greatest changes were seen in regard to individuals' comfort and confidence leading STEM.

Average Rating Scores: Now VS One Year Ago

	NOW	1 YEAR AGO
1. Comfortable Leading STEM	3.3	3.0
2. Interested in Leading STEM	3.4	3.3
3. Confident in Leading STEM	3.2	2.9
4, Capable of Leading STEM	3.3	3.1

Training/Experience/Leading STEM

78% of educators had at least **one to four years of experience** leading STEM activities in out-of-school time.

78% indicated *yes* when asked if they **felt they had enough training/support** to lead STEM activities.

65% identified the role they play in their organization as **site staff**.

51% indicated they had received **less than 10 hours of PD** in the last year.

Participants were asked what kind of STEM training/support they would like to receive. The most common responses were:

- **Support for specific activities** (*e.g., engineering; computer science; connecting STEM to civics, STEM for social justice; increasing math in urban environments; promoting scientific literacy; robotics*)
- **Methods to improve teaching** (*e.g., how to break down complicated concepts; how to teach the same content to different age groups; how to keep students engaged; more ideas/training for hands on cross-curricular activities*)

Examining the 12 Dimensions of Success (DoS)

Overall, STEM19 program ratings indicated programs' **strength in all three Features of the Learning Environment domain** (*organization*, *materials*, and *space utilization*), the dimension of ***relationships*** within the Youth Development in STEM domain, and ***participation*** within the Activity Engagement domain. Areas for growth included the three areas within the STEM Knowledge and Practices domain (*STEM content learning, inquiry and reflection*), *relevance* and *youth voice* under the Youth Development in STEM domain, and *purposeful activities* and *engagement with STEM* found within the Activity Engagement domain.

Each organization that submitted a DoS recording, even those that did not meet the criteria to be scored, was contacted by PEAR to discuss their submission and provided feedback on the strengths, as well as suggestions for improving the quality of the dimensions that needed improvement.

STEM19: Average Rate of DoS by Dimension

* = Averages above 3.0 indicate compelling evidence of quality

Features of the Learning Environment	Activity Engagement	STEM Knowledges and Practices	Youth Development in STEM
Organization 3.6*	Participation 3.3*	STEM Content Learning 2.2	Relationships 3.6*
Materials 3.6*	Purposeful Activities 2.9	Inquiry 2.2	Relevance 2.4
Space Utilization 3.6*	Engagement with STEM 2.6	Reflection 2.3	Youth Voice 2.4

Lessons Learned

Timing is Important

Not all grantees were able to fully participate in data collection.

Some programs could not participate in data collection because the timing of their programming did not align with the timing of data collection rounds. (e.g., a summer only program unable to participate in data collection in the fall and spring).

- Out of 19 programs, only 3 collected both summer and fall CIS-E data; 4 collected both summer and fall CIS-S data; 3 sent in both summer and fall DoS observation videos

- For those who were only able to collect data once, this did not allow them to see if change had occurred through the capacity building efforts

Many of the grantees already had their curriculum set and were executing it when the capacity building activities began.

Organizations could build their capacity through participation, though due to the timing, it was not always possible to integrate changes during the funding period or document if they were occurring.

Program Differences

Due to differences in organizations' programming stages and designs, not all of the technical assistance provided was of equal value or relevance.

STEM19 grantees varied in relation to target population, size, scale, capacity, region, programmatic approach, and stage of programmatic development.

Use of the PEAR instruments was not appropriate for all of the grantees due to their specific programming.

- Grantees who provided short exposure one-off STEM experiences, or those who did not have the same students participate from activity to activity were unable to take full advantage of PEAR tools tools due to the nature of their programming.
- Some organizations provide STEM kits to youth—DoS observations are not appropriate or possible for activities such as this.

Use of the PEAR instruments was not appropriate for all of the grantees due to where they were in their programmatic development.

- Some organizations were early in their program design and felt overwhelmed with the training provided by PEAR.

"I think also, for the webinars, they're so focused, right? So, throughout the webinar, it's talking about this very focused thing. And there's not necessarily that much back and forth in terms of just troubleshooting and just talking."

–FG participant, endline

"I think it took a webinar, at least one webinar, for PEAR to realize. Wait a minute, these guys are still trying to ramp up. And now we're talking about the evaluation process and all of that. And was almost a little cultural shock because I get what you're doing in terms of the DoS...but we are still trying to make sense of how our curriculum is going to be developed."

–FG participant, endline

Lessons Learned Continued

- There was **no mechanism for knowing if or how knowledge gains or increased capacity were shared** throughout the organization (i.e., beyond those who participated directly).

- Grantees were allowed to use the money for whatever they needed. Some hired new staff to expand their programs or paid for critical transportation costs. It was **unclear how sustainability would be addressed once the funds were depleted**.

"Creating a space to have an actual check-in with the folks at the Foundation at some point during the cohort or during the cohort experience and talk about "how's this going?" Like what does the follow-up look like from here? And then at least having some sort of path or direction around follow-on funding to continue to build upon the learning would be super, super."

FG participant, endline

Final Thoughts + Considerations for Future Initiatives

Review of the data indicate that within the funding period, the overarching goals of the STEM19 grant were met, specifically that the quality of the programming the participating organizations provided was strengthened through their involvement, allowing them to better serve the diverse youth with whom they work. What is less clear, is the extent to which these improvements will be sustained or shared within the organization to allow for new learning to become part of individuals' regular practices.

The following considerations are provided for when thinking about future initiatives:

Individuals are interested in connecting with other people and organizations to support their own work and build community. Creating a mechanism for organizations to build and sustain their network would support ongoing connections beyond the life of the grant and support the development of communities of learning and practice.

If the goal is for grantees to utilize specific data collection tools or technical assistance, the type of programming they offer is an important factor (e.g., academic year, summer, sustained participation, one-offs, etc.) to consider in conjunction with the tools they will use.

Having a sense at the outset about the specific capacity building needs of participating organizations would help providers design targeted, meaningful and relevant opportunities, as well as allow for the provision of differentiation, where appropriate and possible.

To examine potential change:

- the timing of the initiative and when opportunities are being offered is important for data collection efforts.

- future initiatives could consider grouping organizations together that offer like types of programming, such as those who do academic year versus those who offer summer programs.

- a longer-term investment is recommended so that organizations can establish a baseline and then examine if they see changes over time. If longer term investment is not possible, for a one-year model, going deep into the DoS framework and quality improvement tools is recommended. This is something individuals could be introduced to and use for future program planning purposes.

If long term change is the goal, sustainability needs to be addressed—adding capacity building around external grant resources or grant writing capacity building could be considered.