



# STEM Education Innovators (SEI) Evaluation Report Cohort 1, Year 2 (2024-25)

Prepared for the  
STEM Action Center



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## Executive Summary

This study examines the second year of the STEM Education Innovators (SEI) program, a five-year professional learning initiative for secondary STEM educators in Utah. This report analyzes program improvements, participant outcomes, and areas for continuous improvement in supporting STEM pedagogy and teacher leadership. The mixed-methods evaluation included monthly post-session surveys, an end-of-year participant survey, and participant focus groups. The following evaluation questions guided the 2024-25 evaluation of the SEI program:

1. To what degree are participants satisfied with the quality, relevance, and usefulness of the professional learning series and resources?
2. To what extent do participants gain the intended knowledge and skills?
3. In what ways do participants implement or apply what they learn in the professional learning sessions related to:
  - a. STEM content knowledge and pedagogical content knowledge
  - b. Teacher leadership capacity
4. How did SEI design and implementation support or detract from the quality and impact of participants' experiences?
5. In what ways was the SEI implemented as intended and designed to address the needs/priorities of participants?

## Key Findings

Findings in this report are organized into the three broad themes presented below. Together, these findings suggest that SEI provided strong support for participants and made key improvements to implementation during the second year, leading to consistent reports from participants of changes in teaching practices, knowledge, and understanding of teacher leadership.

### ***Program implementation and support***

- Participants recognized clear improvements in the quality and design of monthly sessions during Year 2 while noting opportunities to be clear about the session purpose and its connection to the overall program purpose.
- Participants valued specific program activities while expressing mixed feelings about overall relevance and applicability to their work.
- SEI facilitators provide opportunities for feedback and adapted to participant needs and interests.
- Some participants found balancing competing professional priorities with increased program participation demands difficult.

### ***Program outcomes***

- SEI contributed to growth in educators' understanding and confidence related to STEM integration, as participants built on their pre-existing knowledge, engaged in collaborative lesson planning, and some implemented new approaches in their teaching.
- Educators are building an understanding of teacher leader standards and developing confidence as teacher leaders, and some are engaging in more leadership activities in their school communities.
- The Problem of Practice served as the most impactful element of SEI, providing a strong sense of purpose for participants and enabling them to create meaningful changes in their teaching and student engagement.

### ***Program support for collaboration and community-building***

- Participants highly valued opportunities for collaboration in SEI while suggesting that more time and structure in monthly sessions could help maximize peer interactions.
- Peer collaboration provided essential professional support and directly influenced teaching practices, with participants applying specific strategies learned from colleagues to their Problem of Practice work and classroom instruction.

### **Considerations**

The evaluation findings point to several areas for strengthening the program's impact on STEM teacher development and retention:

#### ***Continue reinforcing and clarifying SEI's scope, purpose, and expectations as a professional learning program supporting teaching and teacher leadership outcomes.***

- **Frontload expectations** as much as possible, providing monthly session agendas and slides ahead of sessions, and consider providing participants with a comprehensive overview of all program requirements and timelines at the beginning of each year
- **Develop a clear program roadmap** that connects all SEI components (PoP, teacher leadership, STEM pedagogy, endorsements and certifications) and explains how they work together toward common goals.
- **Streamline Canvas organization** to reduce navigation barriers and make it easier for participants to find and submit assignments.

#### ***Increase focus on supporting educators in implementing strategies and resources related to teacher leadership and STEM pedagogy.***

- **Provide further guidance to support capacity building and the implementation of STEM-integrated lessons.** Supports and resources may include a STEM integration planning protocol, a self-assessment to guide differentiated supports, and continuing to expand the STEM integration resource library with examples of high-quality integrated lesson plans.
- **Provide additional support to help teachers identify opportunities for teacher leadership and overcome school-specific challenges they encounter.** Supports may include office hours with STEM AC staff or breakout room discussions during monthly sessions organized based on educator needs or challenges.

#### ***Increase opportunities for participants to engage with their peers, including providing targeted feedback and generating ideas for moving PoPs forward.***

- **Increase collaborative time in monthly sessions** by allocating more structured time for peer interactions and PoP sharing, potentially reducing presentation time
- **Implement strategic grouping** to ensure participants interact with different colleagues throughout the year (e.g., pairing by subject area, PoP topic)
- **Expand or replicate the annual showcase format** at a smaller scale at other times during the year to provide more opportunities for peer feedback, sharing ideas, and collaborative problem-solving.

# Introduction

The STEM Action Center (STEM AC), which is currently administered under the Utah Department of Cultural and Community Engagement, was established by House Bill 139 in the 2013 Utah Legislative Session. Among their primary activities, STEM AC both identifies and disseminates best practices in STEM education and offers STEM learning experiences for educators, students, and parents. Currently, STEM AC supports an array of STEM programs and events (e.g., STEM Computing Partnership and Professional Learning Grants, STEM Fest), partners directly with schools and districts, works as an innovation intermediary, and provides professional learning in STEM to support educators across the state (Altermatt, Yildiz & Rorrer, 2024; Rorrer, Groth & Colvin, 2025; Zemaitis, Colvin, Reynolds & Rorrer, 2024; Zemaitis, Rorrer, Colvin, & Timmer & Reynolds, 2024).

STEM AC launched the STEM Education Innovators (SEI): Secondary Cohort in 2023. SEI was open to math, science, and CTE (technology, engineering, computer science, and culinary arts) educators. The first pilot program was designed as a five-year program and provides professional learning, support, and resources for STEM teachers in Utah. The professional learning aims to expand the knowledge and skills of STEM educators to support effective and engaging STEM learning environments for students, support and mentor peers in STEM, and develop teacher leadership and mentoring skills. SEI provides a \$7,500 stipend annually for participants, who have agreed to remain in a secondary teaching position for the duration of the five-year pilot.

Participants in the second year of the five-year SEI program continued to engage in STEM pedagogy and teacher leadership development and further refinement of their problem of practice work. This year (Year 2) also included a focus on developing STEM integrated lesson plans and expanded expectations for teacher leadership activities. SEI facilitators reviewed and incorporated feedback from the UEPC Year 1 evaluation, including suggestions from participants to consistently review monthly and program intended outcomes, to increase the practical and directly applicable elements of monthly sessions, and support problem of practice planning. Willingness to listen and respond to participant feedback as well as opportunities for peer collaboration were reported as strengths of the program in Year 1.

To facilitate the 5-year program, STEM AC partners with the Utah Education Policy Center (UEPC) to offer monthly professional learning sessions. The UEPC LIFT team collaborates with STEM AC to plan and facilitate monthly professional learning sessions intentionally designed to develop communities of practice (CPs) focused on practitioner STEM-related problems of practice. These sessions, which are refined based on participant feedback and evolving program needs, scaffold the professional learning for participants.

A separate UEPC team serves as the external evaluator for the SEI program. In this mixed-methods evaluation of program implementation and impact, the UEPC evaluation team addressed five primary questions:

1. To what degree are participants satisfied with the quality, relevance, and usefulness of the professional learning series and resources?
2. To what extent do participants gain the intended knowledge and skills?
3. In what ways do participants implement or apply what they learn in the professional learning sessions related to:
  - a. STEM content knowledge and pedagogical content knowledge
  - b. Teacher leadership capacity

4. How did SEI design and implementation support or detract from the quality and impact of participants' experiences?
5. In what ways was the SEI implemented as intended and designed to address the needs/priorities of participants?

Data for the evaluation include end-of-session surveys for each professional learning session, focus groups with participants, and end-of-year participant surveys. To support continuous improvement of SEI, UEPC shares formative evaluation reports with STEM AC leadership and facilitators following each professional learning session.

The 2024-2025 evaluation report provides a brief review of relevant literature, a description of the mixed methods design that addresses SEI implementation and impact on goals, findings pertinent to the evaluation questions, and considerations to further support and strengthen the implementation and outcomes of the SEI program for the upcoming years.

## **Background Research**

Utah continues to face challenges with educator recruitment and retention (Ni, Rorrer, & Nicolson, 2017; Ni & Rorrer, 2018). Retaining high-quality STEM educators is a primary focus in the state, including efforts to mitigate teacher attrition (STEM AC, 2022). As a way to address these concerns, professional learning can provide resources and supports to build teacher self-efficacy and refine their instruction to support student development (Darling-Hammond, Hyler & Gardner, 2017). Evidence suggests that relevant, job embedded professional learning contributes to educator satisfaction, knowledge, skills, and confidence (Desimone, 2009; Ingersol & Strong, 2011).

Research indicates that professional learning can improve both teacher instructional practice and student outcomes (Darling-Hammond et al., 2017). Darling-Hammond and colleagues (2017) identify seven key characteristics of effective professional development: content-focused, incorporates active learning, supports collaboration, uses models of effective practice, provides coaching and expert support, offers feedback and reflection, and is of sustained duration. Implementing professional learning programs that incorporate these evidence-based features requires systematic planning and coordination across multiple organizational levels to ensure alignment with educational goals and priorities (Rorrer, Groth & Colvin, 2024). Research demonstrates that well-designed professional learning experiences incorporating collaborative experiences can significantly strengthen teacher self-efficacy while simultaneously building educators' leadership capacity (Gardner et al., 2019; Quaisley et al., 2023). Professional learning initiatives which cultivate teacher leadership skills have demonstrated positive associations with improved student achievement (Gaffney & Faragher, 2010; Lai & Cheung, 2015; Warren, 2021).

Engaging with authentic problems of practice provides an opportunity for educators to develop as teachers and leaders while engaging with issues that directly impact their work. When teachers have opportunities to collaboratively examine real challenges from their classrooms—such as analyzing student work, evaluating curriculum materials, or investigating student misconceptions—they develop deeper professional understanding and stronger commitment to the profession (Galosy & Gillespie, 2013; Quaisley et al., 2023). This authentic engagement helps teachers move beyond surface-level professional development to meaningful transformation of their practice. Such collaborative inquiry into practice not only strengthens individual teacher knowledge but also builds the professional community and shared expertise (Weinberg et al., 2021).

Communities of practice (CPs) represent essential structures for supporting ongoing educator development and improvement. CPs are defined as groups of people sharing common interests,

passions, or professions, which can foster connectedness and collaboration to support continuous improvement in STEM education (Lave & Wenger, 1991; Townley, 2020). Research indicates that participation in well-structured professional learning communities enables STEM educators to enhance their instructional practices while simultaneously building the collective knowledge base of their educational community (O'Dwyer et al., 2023). When educators participate in sustained and intentionally designed professional learning experiences embedded within collaborative structures, they develop greater capacity to navigate the complex demands of STEM education and build the professional resilience needed for effective leadership development (Darling-Hammond et al., 2009; Martinovic & Milner-Bolotin, 2024; Quaisley et al., 2023). The theoretical convergence of adult learning principles, distributed leadership models, and communities of practice provides robust justification for comprehensive professional learning programs that address the complex, interconnected challenges of STEM teacher development and retention through sustained, collaborative, and practice-focused approaches that build both individual capacity and collective professional culture.

## Methods

The SEI evaluation was designed to generate actionable insights about the SEI program implementation and outcomes. This Year 2 evaluation included data collection from end-of-session surveys, the Annual SEI Participant Survey, and focus groups with participants. End-of-session survey reports were shared with the SEI program manager and their UEPC LIFT team partners monthly and were used to guide reflections about program progress and program implementation improvements. Data from monthly formative assessments were aggregated for analysis for this report, and monthly reflections provided context and background information to deepen analysis. As described below, methods were aligned to evaluation questions.

## Evaluation Questions

This UEPC evaluation used both quantitative and qualitative data from surveys and focus groups to address the evaluation questions guiding this study. Table 1 contains a summary of the evaluation questions and data sources. Unlike in Year 1, all data sources were used to gather evidence for every evaluation question. Additional information about data sources and collection methods will be discussed in subsequent sections.

**Table 1. Evaluation questions**

| Evaluation Question                                                                                                                         | Annual Participant Survey | Participant Focus Groups | Post-Event surveys |
|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------------------|--------------------|
| 1. To what degree are participants satisfied with the quality, relevance, and usefulness of the professional learning series and resources? | ✓                         | ✓                        | ✓                  |
| 2. To what extent do participants gain the intended knowledge and skills?                                                                   | ✓                         | ✓                        | ✓                  |

| Evaluation Question                                                                                                                                                                                                   | Annual Participant Survey | Participant Focus Groups | Post-Event surveys |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------------------|--------------------|
| 3. In what ways do participants implement or apply what they learn in the professional learning sessions related to:<br>a. STEM content knowledge and pedagogical content knowledge<br>b. Teacher leadership capacity | ✓                         | ✓                        | ✓                  |
| 4. How did SEI design and implementation support or detract from the quality and impact of participants' experiences?                                                                                                 | ✓                         | ✓                        | ✓                  |
| 5. In what ways was the SEI implemented as intended and designed to address the needs/priorities of participants?                                                                                                     | ✓                         | ✓                        | ✓                  |

## Data Sources

The UEPC Evaluation team used three primary data sources to answer the evaluation questions: 1) the monthly formative post-event surveys administered after each PL session 2) a year-end survey of SEI participants, and 3) focus groups and transcripts of SEI participants' responses. This section provides additional information about each data source and describes the UEPC's analyses.

### ***Monthly End-of-Session Surveys***

#### **Overview**

UEPC post-event surveys were distributed to participants after each monthly professional learning session throughout the second year of SEI. Post-event surveys were designed to provide timely, formative feedback about the professional learning sessions' perceived quality, relevance, and usefulness. Additionally, post-event surveys offered an opportunity for open-ended responses. The inclusion of both quantitative ratings and open-ended feedback enabled the evaluation team to identify strengths, surface emergent concerns, and provide improvement suggestions in real time. The brief formative reports were generated by the UEPC Evaluation team and shared them with the STEM AC and the UEPC LIFT team, who used the results to adapt session content, structure, and facilitation strategies throughout the year. Survey results were aggregated and compared across Years 1 and 2 to examine trends and inform broader program improvement efforts.

#### **Data Collection**

The UEPC administered eight end-of-session surveys via UEPC-licensed Qualtrics Survey software between the months of August, 2024, and May, 2025. All 40 participants in SEI in Year 2 were asked to complete the end-of-session survey whether they attended the synchronous monthly session or watched the session recording later. Survey reminders were sent two days after each monthly session and again one week after the session. There was no professional learning session held in December, 2024. In total, 189 survey responses were received, averaging 24 participant responses per survey and

a response rate of 59%. Survey participation was voluntary, consistent with University of Utah IRB protocols. All participants completed at least one survey and, on average, participants completed four out of the eight surveys (with a median of 3.5 and range from 1-8).

Each survey comprised a short set of Likert-scale items about the quality, relevance, and usefulness of the session (rated on a 5-point scale; 1 = poor, 2 = fair, 3 = good, 4 = very good, and 5 = excellent), Likert-scale items asking participants to rate the extent to which intended outcomes for the session were met (rated on a 5-point; 1 = not well at all, 2 = slightly well, 3 = moderately well, 4 = very well, and 5 = extremely well).

In addition to the Likert-scale items, three open-ended questions were asked of participants. These three questions included: what participants found most meaningful, how participants planned to apply their learning to practice, and what supports or changes participants needed to contribute to their success in the SEI program. The question about what participants found most meaningful was only asked in surveys from January-April, and received 52 total responses. We received 115 responses to the question about how participants planned to apply their learning in practice and 85 responses about supports or changes needed for success.

## ***Annual SEI Participant Survey***

### **Overview**

The UEPC's Annual SEI Participant Survey measured participants' overall perceptions of the SEI program implementation and outcomes in Year 2 (see Table 2). The Annual SEI Participant Survey included five sets of closed-ended items that addressed: 1) professional learning design and support, 2) understanding and application of integrative STEM planning and pedagogy, 3) changes in teacher leadership knowledge and practices, 4) problems of practice, and 5) collaboration and community. These categories are consistent with the focus of the SEI Secondary Cohort.

Two sets of items (STEM integration; changes in teacher leadership practices) were administered as retrospective pre- and post-test items, which asked participants to rate each item according to their knowledge and/or practices at the start of the academic year and now (after the end of the second year of the SEI program). Both sets of items were rated based on a five-point Likert scale: 1) Strongly Disagree, 2) Disagree, 3) Neither Agree nor Disagree, 4) Agree, 5) Strongly Agree.

In addition, the UEPC's Annual SEI Participant Survey also included seven open-ended items asking for participant reflections on: changes in their teaching, teacher leadership, and understanding of the importance of teacher leadership, notable outcomes and areas for improvement regarding the problem of practice, how collaboration with peers has contributed to the SEI experience, and additional comments. Survey items were updated in Year 2 to better capture program components and incorporate feedback from Year 1. Changes, however, prohibited direct comparisons of survey findings between Year 1 and Year 2. Table 2 provides examples from each category of closed-ended survey items.

**Table 2. Survey categories and descriptions**

| Category                                                     | Example Items                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Professional learning design and support</b>              | <p>In year 2, the SEI program...</p> <ul style="list-style-type: none"> <li>• reviewed program outcomes and expectations as needed to ensure participant understanding.</li> <li>• set clear expectations and goals for participants.</li> <li>• was well-designed (e.g., structure, pacing, organization).</li> <li>• provided content that was relevant to my work.</li> <li>• adapted educators' professional learning needs and desired areas of growth.</li> </ul>                   |
| <b>Integrative STEM planning and practice</b>                | <p>To what extent do you agree with the following statements NOW, and how much would you have agreed with them AT THE START OF THIS ACADEMIC YEAR?</p> <ul style="list-style-type: none"> <li>• I have a deep understanding of what STEM integration is.</li> <li>• I feel confident in collaborating with other teachers to plan a STEM integrated lesson.</li> <li>• I feel confident in my ability to implement a STEM integrated lesson in my classroom.</li> </ul>                   |
| <b>Changes in teacher leadership knowledge and practices</b> | <p>To what extent do you agree with the following statements NOW, and how much would you have agreed with them AT THE START OF THIS ACADEMIC YEAR?</p> <ul style="list-style-type: none"> <li>• I understand the Utah Teacher Leadership standards and how to implement them.</li> <li>• I use the Utah Teacher Leadership standards to inform my practice.</li> <li>• I see myself as a teacher leader at my school.</li> <li>• I am actively engaged in my school community.</li> </ul> |
| <b>Problems of practice</b>                                  | <p>Rate the extent to which you agree with each of the following statements...</p> <ul style="list-style-type: none"> <li>• My pedagogy has improved as a result of identifying and addressing a problem of practice.</li> <li>• My students have (or will) benefit from the insights gained through my PoP.</li> <li>• I feel confident engaging in the Plan-Do-Study-Act cycle to identify ways to grow and refine my PoP moving forward.</li> </ul>                                    |

**Data Collection**

The end-of-year survey was also administered using the UEPC-licensed Qualtrics Survey software and distributed via email to all program participants in May 2025, following the completion of the final monthly professional learning session in the program's second year. The survey was sent to 40 participants and completed by 28, which is a response rate of 70%. As shown in Table 3, most participants teach science (68%) compared to mathematics (18%) and Career and Technical

Education subjects (14%). Most secondary survey participants taught high school students (61%), while 39% taught middle school (see Table 4).

**Table 3. Year-end survey participants by subject area**

| Subject area                   | Survey participants | Total (All SEI participants) |
|--------------------------------|---------------------|------------------------------|
| Science                        | 19                  | 21                           |
| Math                           | 5                   | 8                            |
| Career and Technical Education | 4                   | 11                           |

\*Some participants teach multiple subject areas. Counts were based on the first subject listed.

\*\*Career and technical education subjects included computer science, technology, robotics, and culinary arts.

**Table 4. Year-end survey participants by grade level**

| Grade level         | Survey participants | Total (All SEI participants) |
|---------------------|---------------------|------------------------------|
| High school*        | 17                  | 25                           |
| Middle school (6-8) | 11                  | 15                           |

\*This count includes career and technical institutes/centers that serve high school students as well as Mountain Heights Academy (online school for 7-12)

## Participant Focus Groups

### Overview

The UEPC's evaluation team conducted focus groups with SEI participants to better understand their professional learning experiences in the second program year. Focus group questions primarily focused on the following three categories: (1) SEI design and implementation, particularly compared to the first year, (2) new knowledge and the application of knowledge and practices as a result of SEI, and (3) participant support and ongoing needs.

### Data Collection

All 40 Year 2 SEI participants were invited to participate in focus groups via email. Participants were sent three emails over the span of four weeks to encourage focus group participation. Emails included a Calendly link to sign up for one of 14 pre-scheduled focus group times over a 10-day period immediately following the final monthly SEI session. Eight focus groups were conducted, ranging in size from 1 to 4 participants. All participants completed focus group consent forms (via UEPC-licensed Qualtrics Survey software) prior to participation. Of the 40 SEI participants, 19 participated in focus groups (47%). Focus groups were conducted via Zoom and lasted 45-60 minutes. The focus groups were recorded and transcribed for analysis.

**Table 5. Focus group participants by subject**

| Subject area                     | Count* |
|----------------------------------|--------|
| Science                          | 10     |
| Math                             | 6      |
| Career and Technical Education** | 3      |

\*Some participants teach multiple subject areas. Counts were based on the first subject listed.

\*\*Career and technical education subjects included computer science, technology, robotics, and culinary arts

**Table 6. Focus group participants by grade**

| Subject area                  | Count |
|-------------------------------|-------|
| High school                   | 13    |
| Middle school/<br>Junior high | 6     |

\*This count includes career and technical institutes/centers that serve high school students as well as Mountain Heights Academy (online school for 7-12)

## **Data Analysis**

Qualitative and quantitative data from the end-of-session surveys, end-of-year survey, and focus groups were analyzed to develop findings for this report. A mixed methods approach to analysis allows for integration across multiple sources and types of data, using both confirming and disconfirming evidence to enhance the analytic rigor and provide a deeper understanding of participant experience.

### **Quantitative Data Analysis**

For monthly end-of-session surveys and the end-of-year survey, closed-ended survey items were analyzed using descriptive summary statistics, then organized and presented in conjunction with related qualitative themes. In the end-of-session survey, quantitative data were analyzed in aggregate across sessions and comparative analyses between Year 1 and Year 2 survey responses were conducted for items related to quality relevance and usefulness. For these items as well as outcome items on the end-of-year survey, statistical analyses (i.e., repeated measures Analysis of Variance (ANOVA) and pairwise comparisons, independent t-tests) were conducted to test for differences across item groups (e.g., comparing retrospective pre- and post-test ratings).

To support consistent interpretation and use of descriptive survey findings, we applied a tiered interpretative approach. Survey items with  $\geq 90\%$  agreement (Agree or Strongly Agree) were interpreted as areas of strong program alignment, support, and/or impact. Items with 75–89% agreement reflected moderate-to-high levels of satisfaction while also demonstrating room for improvement. Items below 75% were areas identified for program staff that warrant intentional focus for improvement during the 2025-2026 program implementation year.

Next, items where more than 20% of responses fell into the Neutral or Disagree categories were also noted as areas for improvement. Attention was given in our analysis and description of findings to when percentage of neutral or disagree were combined with lower levels of strong agreement or relevant qualitative feedback. Additionally, items with fewer than 25% of responses in the “Strongly Agree” category were interpreted as signaling limited confidence or satisfaction and also warranting further attention for improvement.

This interpretive framework is not statistically derived, as the sample size and number of responses are not sufficient to determine statistical significance. Instead, this interpretative framework, which is aligned with developmental and utilization-focused evaluation (Patton, 2010), serves a practical purpose for using the results. This approach also enhances transparency and supports ongoing program learning and improvement.

### **Qualitative Data Analysis**

The UEPC team employed a multi-step approach to qualitative analysis of focus groups and open-ended responses from the end-of-year survey. First, an initial codebook was developed using deductive categories based on the evaluation guiding questions and associated literature. Examples of these codes included categories of program implementation, program support, collaboration, teacher leadership development, classroom impact, and problems of practice. The evaluation team first applied these codes to transcripts from focus groups while remaining open to inductive codes that emerged from the data (Saldaña, 2016). Once all the focus group data were coded, the evaluation team identified key themes within focus groups and reviewed them alongside open-ended survey responses from the end-of-year survey. This review was conducted to better understand data in the

context of the SEI program and the guiding questions of this inquiry. Qualitative data from end-of-session surveys were used only to provide context and were not re-analyzed for use in this report. These responses were shared with the program director and facilitators throughout the year to inform programmatic updates and improvements.

Findings in this report integrate key qualitative findings with quantitative analyses to provide more context and depth and triangulate or identify disconfirming evidence. Quotes were included in the report to offer examples of participant experiences, including bright spots and challenges from Year 2 of the SEI program.

## **Evaluator's Role**

As noted previously, the UEPC partnered with STEM AC in two ways to support the SEI program. First, the UEPC LIFT Team members served as co-designers and co-facilitators of SEI, working with STEM AC program director to develop a scope and sequence for the program monthly sessions. Secondly, the UEPC research and evaluation team partnered with the STEM AC and the LIFT team to evaluate the program, including developing a logic model, collecting and analyzing data, and monthly and year-end reporting.

## **Findings**

The following sections present findings related to program implementation, outcomes, and collaboration among SEI participants. Each section includes two to four key findings supported by quantitative and qualitative analysis. Subcategories within key findings highlight survey data in figures and present illustrative quotes from open-ended survey responses and focus groups.

### **Program Implementation**

In Year 2, SEI was implemented through eight monthly professional learning sessions designed to develop educators' capacity to support effective and engaging STEM learning environments for students, support and mentor peers in STEM, and develop teacher leadership and mentoring skills. Facilitators delivered targeted instruction on topics including teacher leadership standards, gaining the National Institute for STEM Education (NISE) Certification, and the development of integrated STEM lesson plans. Each session incorporated activities and structured discussions that engaged participants in collaborative exploration of concepts and best practices. Participants regularly engaged in breakout room discussions and peer interactions that allowed them to share experiences, troubleshoot challenges, and advance their individual problems of practice—ongoing professional inquiries that participants pursued independently between sessions.

This section of the evaluation findings examines program implementation, using aggregate data from end-of-session surveys and end-of-year data from a survey and focus groups. These data were analyzed to better understand participant experiences and address the following evaluation questions:

- To what degree are participants satisfied with the quality, relevance, and usefulness of the professional learning series and resources?
- How did SEI design and implementation support or detract from the quality and impact of participants' experiences?
- In what ways was the SEI implemented as intended and designed to address the needs/priorities of participants?

Analysis of focus group and survey data revealed key insights into how participants engaged with the evolving program structure, intersession activities, and the support provided by STEM AC and UEPC LIFT teams. The findings indicate that SEI continues to be responsive to participant needs and has significantly evolved from Year 1 in terms of overall program design and clarity, while many participants still struggled at times to navigate the wide range of program expectations.

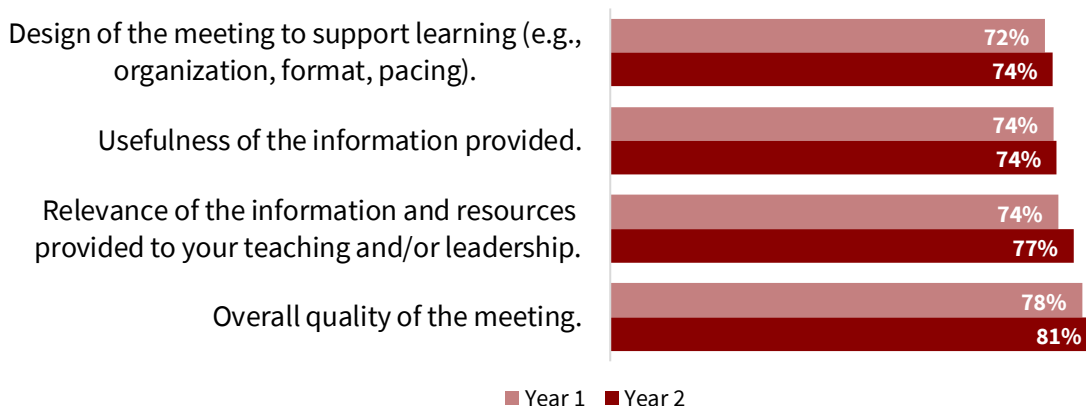
***Participants recognized clear improvements in the quality and design of monthly sessions during Year 2 while noting opportunities to be clear about the session purpose and its connection to the overall program purpose.***

In response to feedback provided in end-of-session surveys and the Year 1 evaluation report, SEI facilitators sought to improve the design and implementation of monthly sessions, including adding guest speakers to share expertise and insight about topics such as STEM career pathways and state-level guidance and certifications for STEM teachers and schools. Facilitators also responded to Year 1 feedback about program clarity by frequently reviewing the program purpose and overarching design, and by asking participants to sign an updated memorandum of understanding which reiterated the importance of completing intersession work and attending synchronous monthly sessions.

Participants across most focus groups acknowledged meaningful improvements in Year 2 program implementation, particularly noting the facilitators' responsiveness to feedback and their efforts to make content more accessible and relatable. The most frequently cited improvements included the clarity of design and overall direction of the program, reduction in educational jargon and pedagogical theory during monthly session presentations, and a willingness to adapt based on participant input throughout the year.

Figure 1 compares Year 1 and Year 2 post-session survey ratings, indicating slight positive trends among participants who rated the SEI professional learning monthly session design, quality, relevance, and usefulness as "very good" or "excellent" on a five-point scale. While statistical tests indicate that these differences were not significant ( $p > 0.2$  for all items based on Welch's t-tests), the consistent pattern of small positive changes across measures, when considered together with participants' qualitative reports, suggests that efforts to improve SEI design may be recognized and valued by participants.

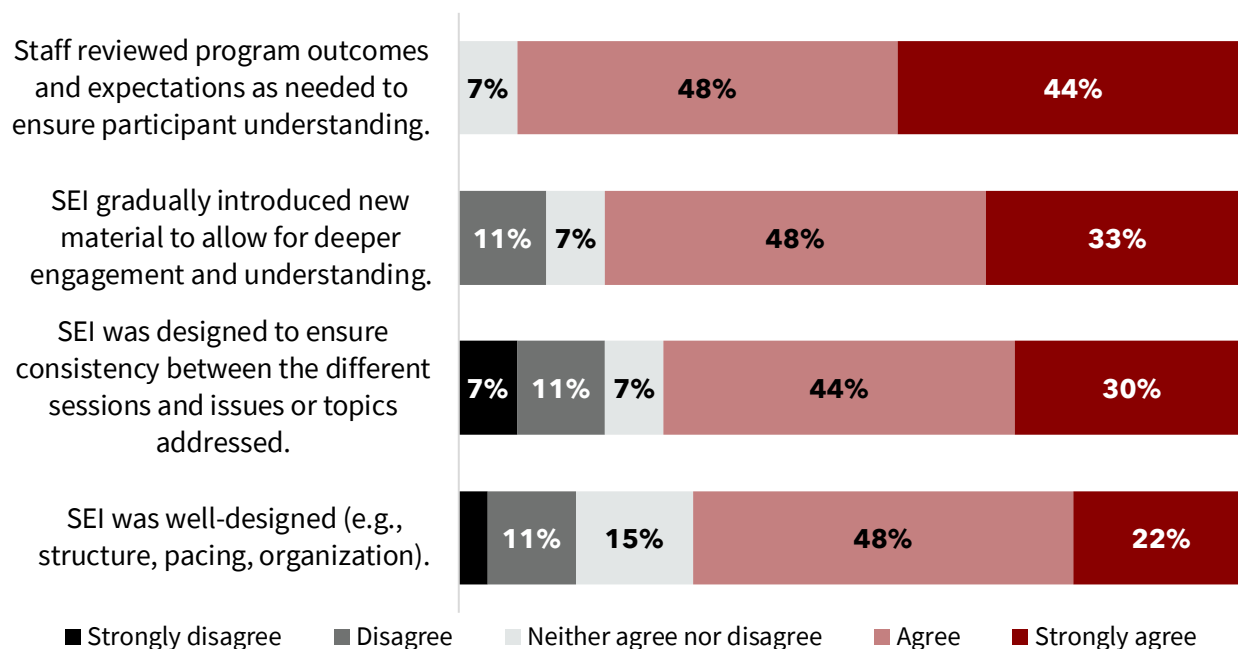
**Figure 1. Year 1 and Year 2 comparison of participants who rated post-session survey items "very good" or "excellent"**



**Source:** Post-session surveys (Year 1, n = 199; Year 2, n=189)

Figure 2 provides additional participant perceptions about SEI design in Year 2. These survey items were asked in order to better understand the extent to which participants noticed and benefitted from facilitators' efforts to clarify the program purpose and participant expectations and to improve the consistency and transitions across monthly topics (e.g., STEM integrated lessons, teacher leadership standards). Figure 2 shows high levels of agreement (92% agree or strongly agree) that staff reviewed program outcomes and expectations as needed, and general satisfaction with the pace at which SEI introduced new material to allow for deeper engagement (81%). Two items—consistency of design between sessions and topics, and overall perceptions that SEI was well-designed—fell below 75% total agreement and thus may be areas for continued attention in Year 3.

**Figure 2. Participant perceptions of SEI design**



In focus groups, participants clearly indicated a sense of improved program clarity and design when asked to compare between Year 1 and Year 2. Educators specifically noted that facilitators "got into a groove and figured out a system that works" and that "the quality of the meetings improved." In multiple focus groups, participants acknowledged the SEI program staff's efforts to clarify the purpose, agenda, and structure of monthly sessions, improving the flow and clarity of sessions compared to Year 1.

- *I feel like last year when we popped into a meeting, I had no idea who was there or what their goals were, but then they were telling us to do all these things that we'd never heard of before. But this year, I think they've been a little bit better and they've gotten better, especially through the year, of laying out the objectives for the day and what needs to be done before next time and why we're doing all those things. (Focus group)*
- *And it's way less jargony this year. And so, I'm not a jargon person. I'm not an academic in education. And so that change, for me, has been really important and powerful. (Focus Group)*
- *I think that the slideshows that they've put together for us have definitely improved... they're pretty consistent in saying, 'This is our agenda today. These are the objectives.' And then at the end... they say, 'This is what we'll look forward to doing in the future.' (Focus group)*

While many participants noted significant improvements in the implementation of monthly sessions, overall structure of the program was also the most frequently discussed area for growth in focus groups. For instance, participants expressed uncertainty about the “unifying concept” of SEI and feeling that the program focus shifted from month to month, creating added complexity to the participant experience. Participants noted that the program seemed to “jump around,” with a shifting focus from month to month.

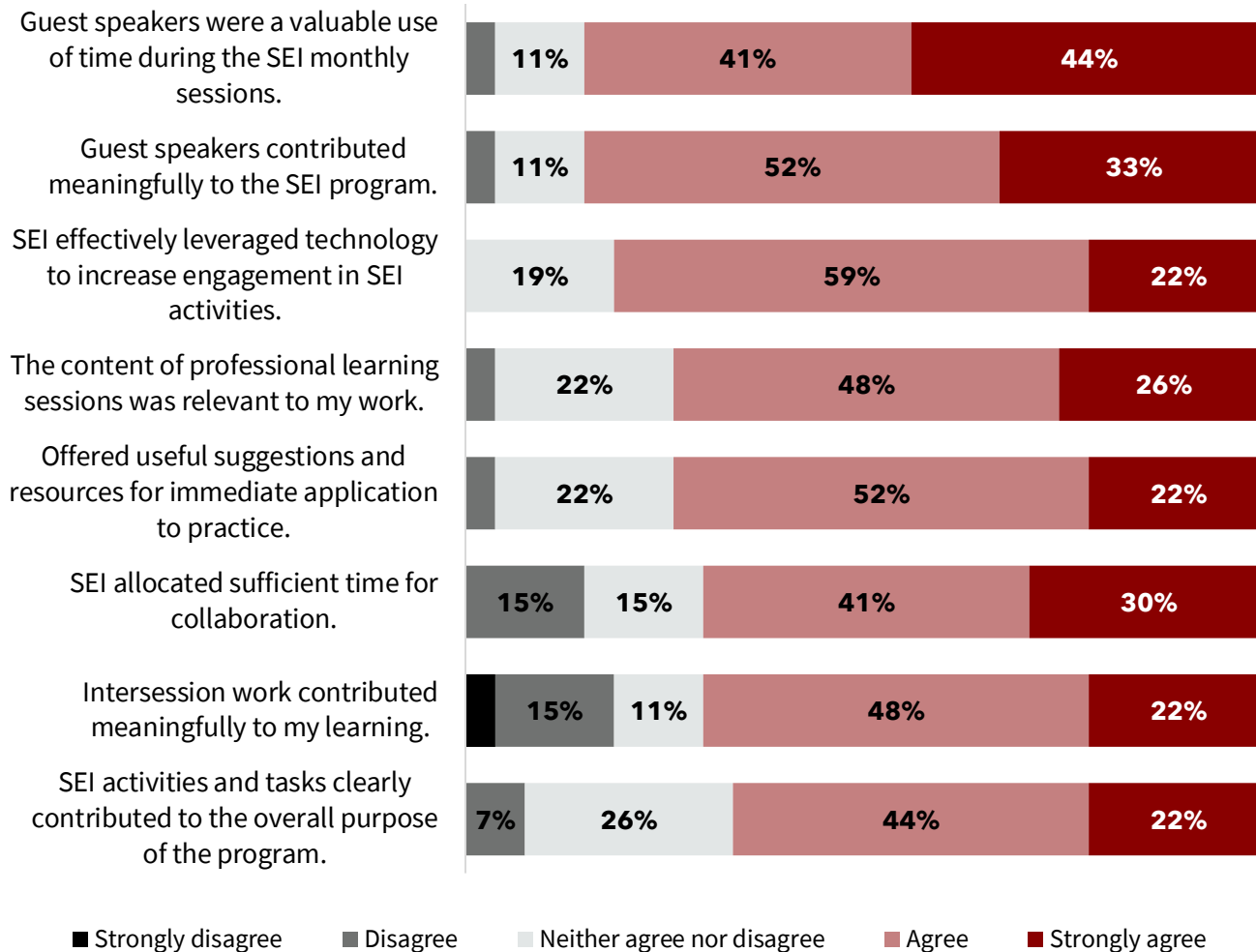
- *I feel like every month feels like a new different thing... some of it feels, and I think with a group as big as ours, it's hard to find lessons that are going to be meaningful for all of us. I wish it was more focused. (Focus Group)*
- *One of the reasons why it felt like we were jumping around with topics a lot was because there's no big unifying concept. For example, if the unifying concept was we want you to make you better STEM teachers and because we want to make you better STEM teachers, let's look at NISE certification... But also, those two big core ideas, making you a better STEM teacher or having you have a bigger impact, that's not how it's framed. It's framed in the sense of activity, activity, activity, activity and then I need to find value in that. (Focus Group)*
- *Things felt like they really jumped around. I think it was because the vision of what we are doing wasn't developed in my brain. (Survey)*

### ***Participants valued specific program activities while expressing mixed feelings about overall relevance and applicability to their work.***

While the preceding findings describe general perceptions about SEI’s structure, design, and support from staff, this section more closely examines specific facilitation activities and program tasks during Year 2. Data revealed that participants were meaningfully engaged with certain SEI content and activities, often valuing guest speakers and finding intersession work meaningful, but they also expressed a desire for more focus, clearer connections between activities, and content that was more directly applicable to their needs and contexts.

Figure 3 shows that educators reported strong agreement that guest speakers were a valuable use of time at monthly sessions (85% agreement) and that they contributed meaningfully to the program (85% agreement). Participants also highly rated SEI’s use of technology to facilitate engagement (81% agreement), suggesting that synchronous facilitation using Zoom, breakout rooms, and other online platforms has been successful. Additional items suggest areas for continued attention for program facilitators, including the relevance and applicability of SEI content and resources (74% agreement), the time dedicated to collaboration during monthly sessions (71% agreement), the contribution of intersession work to meaningful learning (70% agreement), and the overall sense that SEI activities aligned with the general purpose of the program (66% agreement). Each of these items included 25-30% neutral or disagree ratings.

**Figure 3. Participant ratings of SEI program content and features**



Source: End-of-year survey (n = 27)

### Highly valued program components

In focus groups, participants consistently identified guest speakers as valuable components of monthly sessions. For instance, they expressed appreciation in hearing outside perspectives and gaining resources and connections.

- *I have loved having the experts coming in, the guest presenters. I think a lot of those have been really interesting. I'd love to have more of that for sure. Was something that I've really enjoyed getting connected with the resources across the state, so that's been really cool. (Focus Group)*
- *I like guest speakers. I feel like it gives me an outside perspective on a scientific or math principle that we can use. I like that. I feel like that helps me as a professional learn more. (Focus Group)*

While quantitative data suggests that some participants were interested in more time for collaboration, most cited peer interactions and small group discussions in breakout rooms as beneficial to their SEI experience. These collaborative experiences provided both practical solutions and professional support.

- *I feel like the benefits I'm getting from the interactions, even if sometimes we're not on the topic we're supposed to be on when we're in breakout rooms, or whatever, even just these interactions, I'm like, 'These are such good ideas. This is such a good connection I have.'* (Focus Group)
- *Allowing us to have space to communicate... this is what's keeping us going, this is what's allowing us to grow and be these teacher leaders that are making change.* (Focus Group)

### **Program components with mixed perceptions**

While some program components, such as guest speakers and peer collaborations, were nearly universally valued by participants, others were described with a wider mix of opinion. For instance, most participants felt that intersession activities were beneficial, although many waited until the week before the monthly session to complete them and occasionally viewed them as "busy work." The purpose of intersession work was to support greater accountability for addressing participants' problems of practice, allowing time to reflect on STEM teaching practices, and providing opportunities for implementation of new learning. Some expressed a sense that the work achieved this purpose.

- *I feel like for the most part it's been beneficial and that the assignments are applicable and meaningful and about the right amount of work. Enough to make it meaningful but not be overbearing.* (Focus Group)
- *I think there have been some things that I've been like, 'Yeah, that was worth my time.' And there's still always going to be some things that I'm like I just checked a box, but overall, I think it's been okay.* (Focus Group)

For others, intersession work was perceived as less of a priority and viewed as something that could be put off until the week before the next session.

- *As far as working on intersession work, for me, it often gets put to the back burner, and I think that's probably the same for most of us. We go to the meeting, we're like, 'Okay, I need to get this done.' And then the next day hits and we're like, out of our brain. We don't think about it again until we get a reminder for our next meeting and, 'Oh, I better get on and do that.'* (Focus Group)
- *So there's something there that just doesn't feel like I have to be held accountable for that. And I do get the pressure this year is like, 'Well, you need to do all these things. And it's in the contract.' And I'm kind of just like, well, I don't know now if this is worth it, because that's how disconnected I'm feeling from the assignments.* (Focus Group)

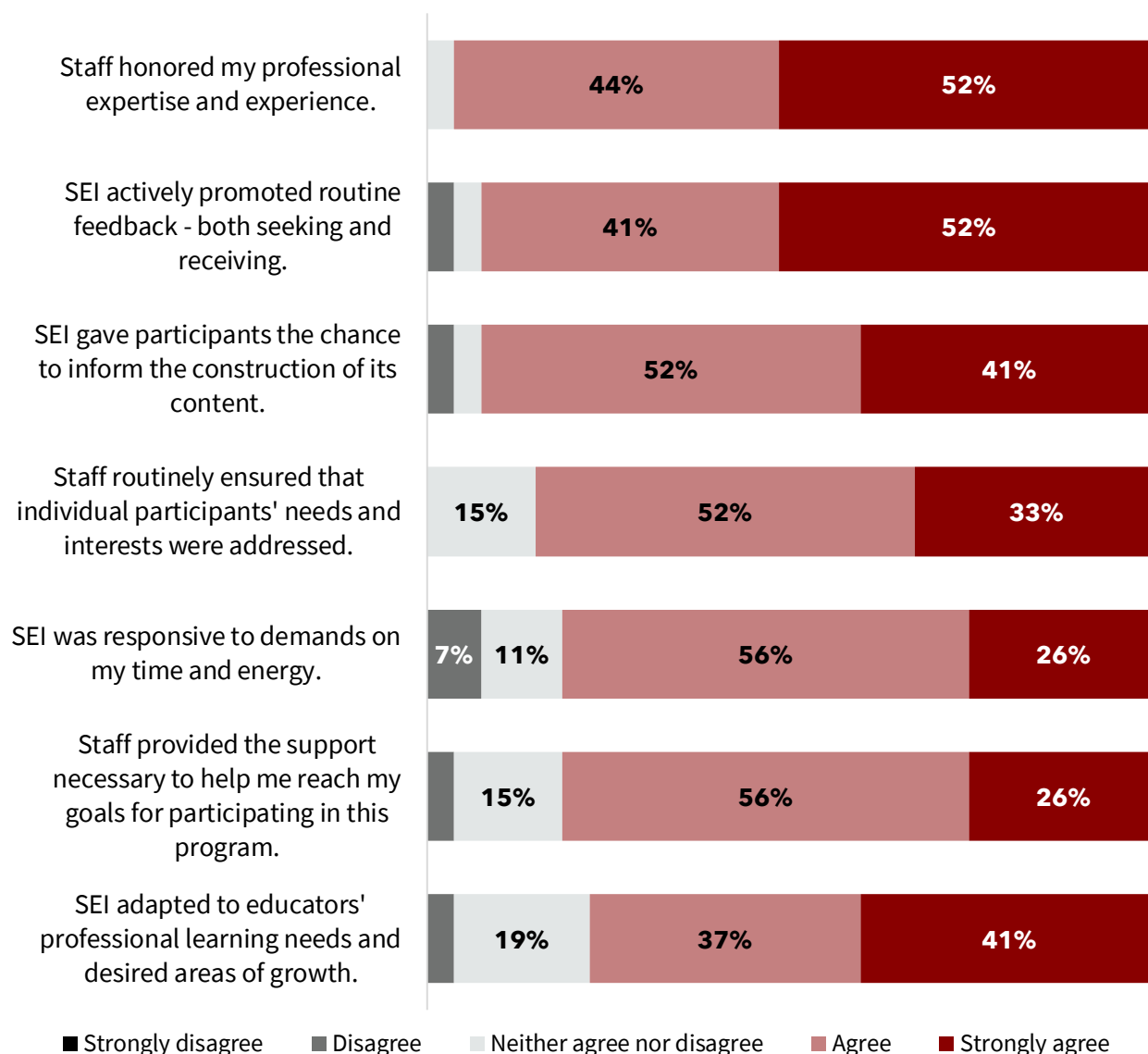
While participants rated SEI's use of technology highly, many in focus groups described Canvas as an ongoing challenge. This may suggest that technologies such as Zoom and other synchronous online activities have worked well, while Canvas organization and utility (a platform used primarily asynchronously) may be an area for improvement. While some participants noted improvements to Canvas organization—"I was just going to say I feel like the Canvas is more set up better, just easier to navigate"—technical challenges persisted for many participants.

- *I think it would be helpful to have something more organized in Canvas that is more clear... But again, I feel like that has gotten better than it was last year, but still an area where sometimes I'm like, 'Wait, what were we going to do?' It takes me time to get reoriented.* (Focus Group)
- *I think there could still be some improvement in the Canvas course. I know they've tried and there's been some changes, but I don't know that they've really made a lot of difference, in my opinion.* (Focus Group)

***SEI facilitators provide opportunities for feedback and adapted to participant needs and interests.***

In addition to strengthening the design and structure of monthly sessions in Year 2, participants expressed a sense that SEI facilitators valued their perspectives, asked for their feedback, and made efforts to adjust the program based on that feedback. Figure 4 shows that participants highly rated (agree and strongly agree ratings > 90%) items about staff honoring their professional expertise, actively promoting routine feedback, and giving participants the chance to inform the construction of program content. Ratings also indicate general satisfaction (agreement levels between 75-89%) with items about staff's support and responsiveness to participant needs and program adaptations to align with participant interests and desired areas of growth. None of the items in Figure 4 received more than 25% response rates in neutral or disagreement categories. Overall, these items suggest that SEI's responsiveness and attention to participant needs are a strength of the program.

**Figure 4. Participant perceptions of SEI responsiveness and opportunities for feedback**



**Source:** End-of-year survey (n = 27)

Analysis of focus group data also indicated that participants appreciated the program's responsiveness and that program staff made efforts to address concerns and enhance participants' experience. As the quotes below indicate, specific examples of SEI's responsiveness include adjustments based on feedback, better communication ahead of and between monthly sessions, and increased cohesion among the team of facilitators.

- *I sincerely appreciate all of the adjustments being made along the way and the fact that our feedback is not only heard, but acted upon. That makes a big difference. (Survey)*
- *I feel like the communication has been a lot more clear. They're taking feedback from us about how to lay things out in Canvas and pacing. Yeah, I definitely feel like there's been improvements this year from last year. (Focus Group)*
- *Yeah, I mean, I definitely think that the listening, and the reflecting, and the intentionality of all of the facilitators, [facilitator] especially, is good at recognizing what goes on in the chat, and acknowledging it, and elevating it to the level of conversation. And that is something that I think was hard when it was just [previous facilitator]. And so I think having a team of three makes it easier for them to pick up the pieces in that way, and support each other in making sure that everybody gets heard and valued. (Focus Group)*

### ***Some participants found balancing competing professional priorities with increased program participation demands difficult.***

In response to feedback provided in the Year 1 evaluation report, program facilitators revisited participant expectations early in Year 2, including developing a revised Memorandum of Understanding (MOU) for participants and introducing new or revised program components. Among these, SEI introduced the National Institute for STEM Education (NISE) Certification as a program expectation after Utah decided not to move forward with a teacher leadership endorsement. SEI also shared information about school STEM designation, although this was not introduced as a program requirement. Additionally, the MOU re-emphasized the importance of attending synchronous sessions and completing intersession work on time.

Participants shared mixed responses to these updates in focus groups. While some expressed openness to the NISE certification process and acknowledged the intention behind the revised MOU as an effort to continue to refine the program design in Year 2, participants in every focus group expressed some concerns about changes in program expectations and demands. For instance, some participants described the changes as introducing "a lot of pieces" that created a more complex and program structure while others described concerns related to increased intersession work, the addition of the NISE certification process (also referred to as the STEM Endorsement), and the ongoing collaborative development of a STEM integrated lesson. The addition of the NISE certification received the most scrutiny in focus groups, as multiple participants described it as an unexpected addition, and one participant said, "it came out of nowhere."

- *I mean, the first thing that jumps out at me is that there is a lot of pieces... I can kind of see the connection, but it's also feels like, it's a central point with all of these spokes and I don't know where to put my attention. (Focus Group)*
- *The STEM endorsement, for sure, came out of nowhere, and it was like... Then I remember, the one thing I really appreciate is the transparency from facilitator side to us... But I remember last year hearing that they're also making a plan and deciding things as they go, building the program as they go. And so this felt like, 'Hey, we need to do something else and this is going to be that something else.' (Focus Group)*

- *The shift to NISE was unexpected and the rollout was time consuming (a huge part of the November meeting) and confusing, and despite resistance and uncertainty, the program steamrolled over us instead of stopping to listen and be reflective about whether that certificate would actually lead to better outcomes for us. (Survey)*

Some participants added that the increased demands of SEI were coupled with outside demands on their time that challenged their capacity to meet program expectations. Multiple participants characterized themselves and their SEI peers as ambitious in terms of seeking opportunities for professional growth, but that their willingness to take on additional responsibilities (such as, but not limited to SEI) sometimes led to strains on their time and professional capacity.

- *And I think the people that sign up for a program this are like that, there're going to be people that have a lot of things on their plate, a lot of things they're excited about. I mean, I myself just applied for [another program]. So there's a lot of pieces within the program, and there's also, I think for many of us, a lot of pieces outside of the program. (Focus Group)*
- *So it gets overwhelming. It's the same feeling I have with my students, like you want to do it all and be everywhere, but then you realize that you don't have the capacity to do it all well. And so, I'm trying to be strategic about what I can do well and what I need to let go of. (Focus Group)*

## Program Outcomes

This section includes findings on SEI participants' perceived development and application of knowledge and skills related to their classroom practices and teacher leadership. Focus groups and survey data were analyzed to provide information about the ways and extent to which SEI influenced changes in teachers' understanding of pedagogical and leadership concepts and strategies, as well as the ways in which teachers applied what they learned in SEI in their own schools and classrooms. The findings in this section address the following evaluation questions:

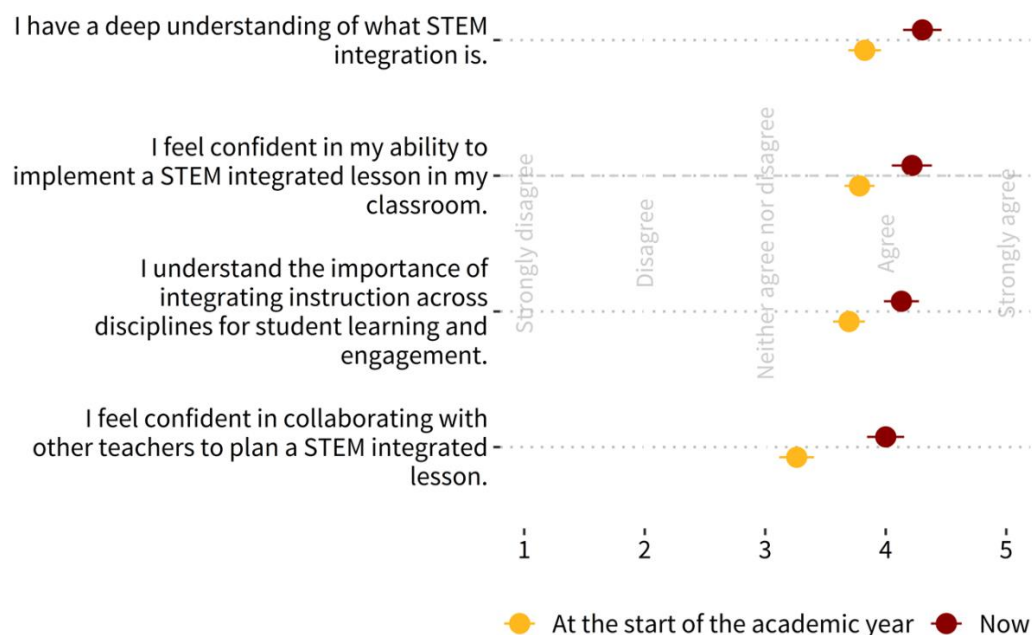
- To what extent do participants gain the intended knowledge and skills?
- In what ways do participants implement or apply what they learn in the professional learning sessions related to: a) STEM content knowledge and pedagogical content knowledge, and b) teacher leadership capacity?

***SEI contributed to growth in educators' understanding and confidence related to STEM integration, as participants built on their pre-existing knowledge, engaged in collaborative lesson planning, and some implemented new approaches in their teaching.***

STEM integration was a key focus of the SEI monthly sessions in Year 2. SEI facilitators sought to develop participants' understanding and confidence to leverage STEM integrated lessons across subject areas. After building foundational knowledge and ensuring clarity around why STEM integration was important, participants had the opportunity to collaborate with a peer to create a STEM integrated lesson.

In the end-of-year survey, participants were asked to rate their understanding and confidence in STEM integration now and, retrospectively, at the beginning of the academic year. Figure 5 shows that ratings across all four items were significantly higher ( $p < .05$ ) at the end of the year than at the start, including deepening their understanding of STEM integration and collaborating with others to co-design an integrated lesson plan.

**Figure 5. Changes in STEM integration knowledge and practices from the end-of-year survey**



**Note:** To compare the “Start of year” and “Now” contexts fairly, we excluded any responses that were provided only at one time point and not the other. Responses to both time contexts were available for 85% of participants (n=23).

In focus groups, participants described varied levels of engagement with interdisciplinary and cross-curricular STEM approaches. While some participants described meaningful shifts in their teaching practices, others indicated that SEI primarily reinforced approaches they were already implementing or resulted in limited application due to practical constraints.

### Meaningful change in practices

Among those who described meaningful changes in their thinking and practice, several educators reported increased intentionality in making cross-curricular connections, and one participant described “a pretty profound pedagogy change” toward focusing on “skills rather than content.”

- *I think really trying to think interdisciplinarily has been a big part of it... we did this interdisciplinary class last fall, and we were really explicit... that the goal was for [students] to write a scientific paper... I would say that's a pretty profound pedagogy change that I've been making over the last two years is, I'd do a lot of UDL research as well, and just focusing on is it a skill, or is it content? (Focus Group)*
- *I've been reminded of integrating... trying to not just think of science as a standalone or any standard that I teach as a standalone thing, but anytime I can pull something else in... I've tried to just do a little bit more integration. (Focus Group)*

### Reinforcing best practices

For participants already engaged in interdisciplinary work, SEI validated existing practices. Several participants also described significant challenges in implementing integrated approaches, particularly concerning coordination with colleagues and curriculum timing.

- *I already was trying to do [integrated lessons], but you get in a rut sometimes. You get reminded of things like, "Oh yeah, I need to do better on that. I need to refocus on that again." It has helped me do better on those two things that I think are important but I had slid back a little bit on. (Focus Group)*
- *So that's been super easy for us because that's what we've been doing. You know what I mean? That is what we're doing in the classroom. And so when we wrote our integrated lesson plan... we just formalized a lesson plan that we were doing. (Focus Group)*

### **Challenges implementing integrated lessons**

Some participants also noted challenges in developing integrated lesson plans. In some cases, participants cited timing and capacity difficulties, while others noted specific difficulties related to their content area or finding collaborators in their school.

- *And the integrated lesson plans, I love the idea, I love the concept. I was able to work with someone that's in my building with me. But timing is so hard, getting it to where their curriculum lines up with my curriculum, and we can actually do the lesson together at the same time and get the full bang for our buck. It very much means I see the vision, but I haven't had it land for me personally yet. (Focus Group)*
- *The math that I'm doing doesn't always integrate very well with other subjects, and it's a real stretch to manage that. Even planned integration is really difficult. (Focus Group)*

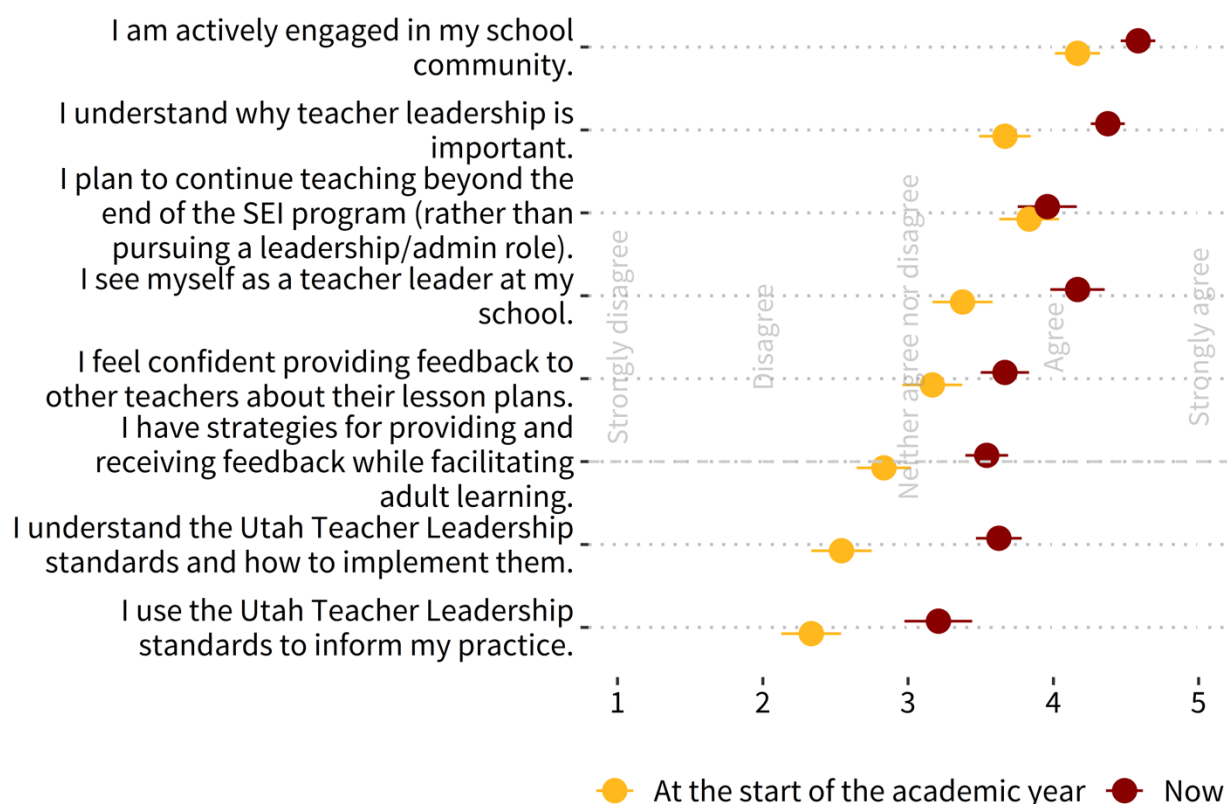
Together, focus group and survey data suggest that participants appreciated the concept of STEM integration and could identify its value, but practical implementation remained challenging for many. The quotes below provide additional evidence of these successes and challenges, highlighting participants' proactive efforts to engage in STEM integration as well as the practical challenges of implementation.

### ***Educators are building an understanding of teacher leader standards and developing confidence as teacher leaders, and some are engaging in more leadership activities in their school communities.***

During the second year of the SEI program, teacher leadership standards (National Standards and USBE's Portrait of a Teacher Leader) were shared and discussed by the SEI facilitators to support changes in educators' leadership practices. In focus groups and survey responses, many participants indicated that they have meaningfully grown in understanding and confidence related to their teacher leadership. At the same time, participants also described facing ongoing challenges in translating these concepts into concrete leadership practices.

In the end-of-year survey, participants were asked to rate their understanding and level of application of teacher leadership standards and practices now and, retrospectively, at the beginning of the academic year. Figure 6 shows that ratings across seven of the eight items were significantly higher ( $p < .05$ ) at the end of the year than at the start. Notably, the most significant improvement in ratings over time was found in educators' understanding and application of the Utah Teacher Leader Standards, as well as understanding why teacher leadership is important.

**Figure 6. Changes in teacher leadership perceptions and practices from the end-of-year survey**



**Note:** Responses to both the “start of year” and “now” time contexts for the leadership items were available for 89% of participants. (n=24).

### Building understanding and confidence

Focus group data aligned with survey findings, as many participants described notable shifts in how they viewed themselves as leaders, with some taking tangible steps toward leadership roles within and beyond their schools. Participants described various ways they applied leadership skills, from mentoring colleagues to sharing resources and leading school-level initiatives. Several participants described sharing SEI learning with colleagues, acting as conduits for new ideas and resources within their schools. Notably, many participants expressed renewed commitment to staying in the classroom, with several indicating that SEI had reinvigorated their passion for teaching and postponed considerations of leaving for administrative roles. In the quotes below, teachers describe meaningful shifts in their teacher leadership, including presenting at a conference, sharing more with colleagues, and taking on advising responsibilities.

- *I've been teaching 17 years, and I've just been pretty happy to be in my own little world, and do my thing... But to be challenged to be leaders, I've accepted that. And so that's something that this year and going forward, I've made a priority to try to change that. I've been collaborating with one of my colleagues at my school quite a bit, and we're doing a joint presentation at the Utah Science Teachers Association in the fall. So that's something I would've never done a year ago. (Focus Group)*

- *I've been able to take some of what we've learned here and, in our department meetings, talk about it with my coworkers... I'm spreading the information that is beneficial for us as educators to know. (Focus Group)*
- *I didn't go into teaching a traditional route... sometimes I feel like a little inadequate... but I think that it's helped me build confidence and that I've taken on some leadership roles. I have a role now with the district and I have a role with my new school to be an advisor, and I'm still in the classroom with those roles. (Focus Group)*

### **Limited opportunities to engage in teacher leadership**

Multiple participants described appreciation for deepening their understanding of the teacher leadership standards, but cited difficulties understanding how they could translate that understanding directly to practice. Examples included contextual challenges about their role or school limiting their opportunities to engage in leadership activities (e.g., lack of support from administrators, confidence level based on teaching experience, etc.).

- *I don't feel like I'm in a position at my school where I can be a teacher leader. I'm still considered a newer teacher and would be seen as overstepping if I tried to take on leadership roles. (Survey)*
- *I feel more confident in my understanding of what teacher leadership looks like, but I haven't had many opportunities to practice it at my school level. (Survey)*
- *I have learned about teacher leadership standards and feel more confident about what they mean, but applying them in my school context has been challenging due to existing hierarchies and limited opportunities (Survey)*

### **Limited understanding and prioritization of the teacher leadership standards**

In some cases, educators expressed limited understanding of the teacher leadership standards and described them as less of a priority in their thinking about program content. Overall, the evidence suggests that while SEI successfully supported educators in building their knowledge and awareness of the teacher leadership standards, some participants continued to describe confusion about the teacher leader standards, indicating that they were familiar with a variety of different educator standards but that the leadership standards were not “front stage” for them.

- *[The teacher leader standards are] separate. That is separate from the STEM certification standards, right?... So, I would say that's in the background of my mind, in a way, the fact that I sort of confuse those two, it tells you that that has been less, that's been more in the background of my mind. (Focus Group)*
- *I guess it's triggered ideas in my head of maybe I should go get my National Board Certification or something that uses those standards more, but really, I just, it's not something that's super front stage for me. (Focus Group)*
- *That's one of those things that I struggled with—where our first meeting last year we had standards. I felt like that's what they were called. And then this year there were different standards. And then at some point there were a different set of standards. And I kept asking. I asked that, "What is this? What am I looking for? Where is it coming from?" I think I'm still confused. (Focus Group)*

***The Problem of Practice served as the most impactful element of SEI, providing a strong sense of purpose for participants and enabling them to create meaningful changes in their teaching and student engagement.***

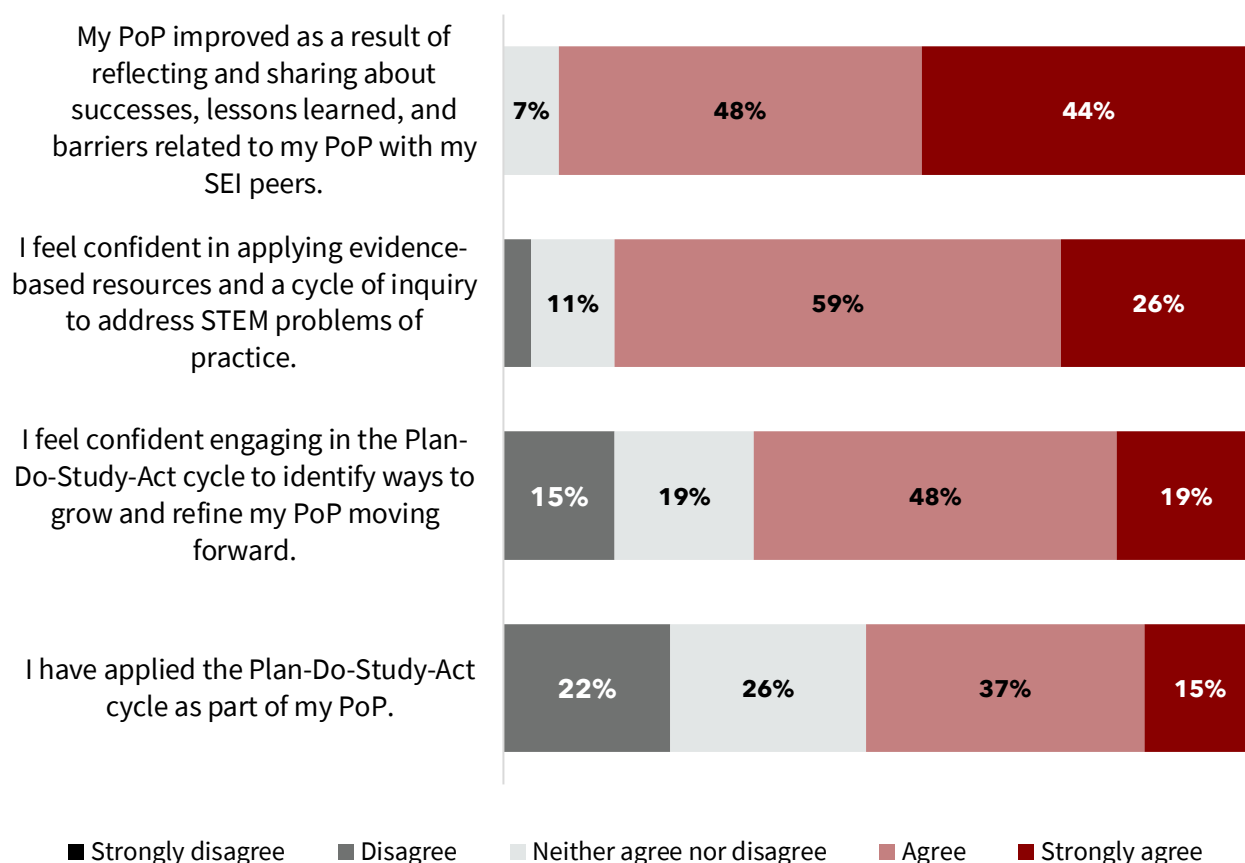
The Problem of Practice (PoP) element of SEI was described by many focus group participants as the most impactful and meaningful aspect of the program in fostering professional growth and school/classroom change. Participants consistently described their PoP work as the central element of their SEI experience, serving as both a focus for their professional learning and a vehicle for implementing broader changes in their classrooms and schools. Evidence from surveys and focus groups suggests that the PoP process enabled participants to take ownership of their professional development while generating improvements for their students and school communities.

### **Developing the problem of practice**

In Year 2, participants moved from idea generation about their problem of practice and initial implementation to more fully realized application of their proposed strategies and data collection about the initial effectiveness of their problems. PoPs differed across participants, with some working to develop new curriculum for their courses, some participants implementing new field trips and experiences for their students, and others using a variety of strategies to increase engagement in STEM for targeted student groups. SEI supported participants in their PoPs by providing funds to spend toward resources, conferences, or field trips; facilitating collaboration and reflection on the PoP process during monthly meetings; and providing guidance related to inquiry cycles such as the “Plan-Do-Study-Act” (PDSA) framework.

As shown in Figure 7, almost all (92%) agreed that their PoP improved as result of reflection and sharing with their SEI peers, and nearly as many (85%) expressed confidence in apply evidence-based resources and a cycle of inquiry to address a PoP. Fewer participants were confident in engaging in the PDSA framework (69% agree or strongly agree) and had applied it in their PoP (52%).

**Figure 7. Participant ratings of the implementation of their problem of practice**



**Source:** End-of-year survey (n = 27)

In focus groups, participants frequently described their PoP as the primary reason for their continued engagement with SEI. The PoP work appeared to provide both motivation and structure for sustained improvement efforts, in terms of developing course curriculum to improve instruction or generating increased student engagement and excitement about STEM.

The collaborative aspect of the PoP work was particularly valued, with participants describing how sharing their challenges and progress with peers provided inspiration and practical feedback. The monthly discussions allowed participants to hear different perspectives and make adjustments to their PoP specific to their school contexts.

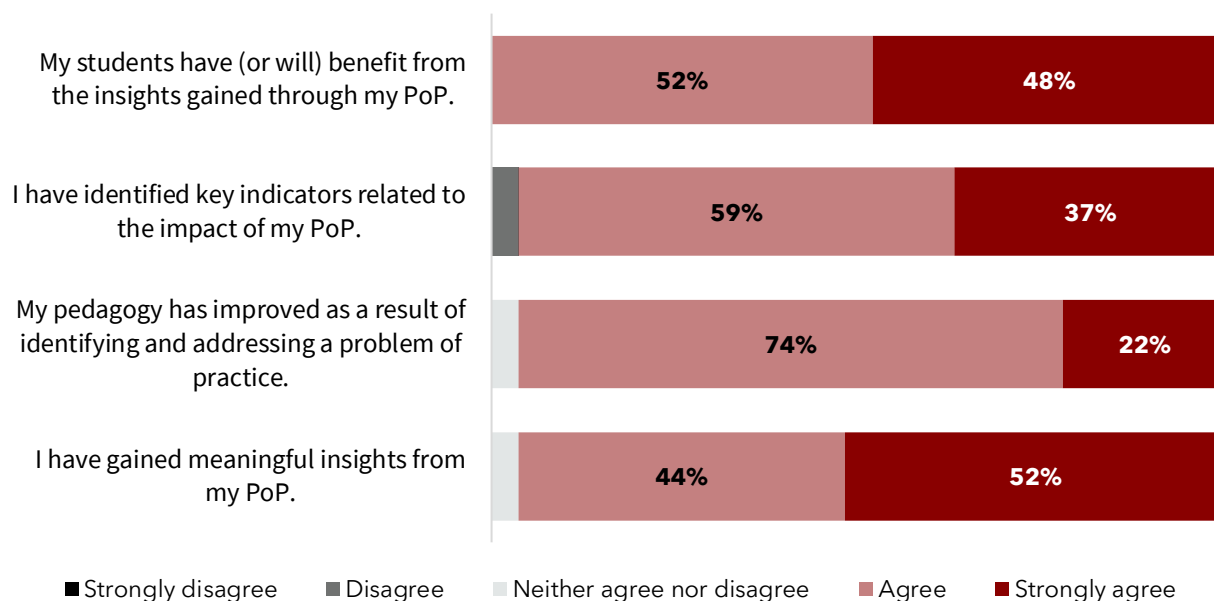
- *That is the reason that we're here, and that's what I'm spending my money on... Just hearing the different ideas each month has really expanded how I think about STEM, and how I see myself as a STEM educator. (Focus Group)*
- *Also, I feel like it's just hearing people, and just setting aside the time once a month to think about it, and to challenge myself to move the problem forward a little bit more has been helpful. (Focus Group)*
- *This part of, we're going to solve a problem in education... What we're really doing is we're focusing on something that we want to see happen and have change. And that is happening from this community. (Focus Group)*

## Impact of the problem of practice

Participants appreciated the monthly accountability and peer support for advancing their PoPs. Multiple participants described how their PoP evolved and expanded, growing from a focus on their individual classroom to broader school-level impacts. As one participant explained, "my problem at practice started teeny, teeny tiny, and every year it's growing in scope, because I'm realizing through the work I do with this group, I can have more impact."

Several participants provided concrete examples of improved student engagement and learning outcomes, including increased engagement in coding classes, improvements in student survey ratings about working together, and fulfilling their roles on group projects. As shown in Figure 8, participant ratings of the impact of the PoP were very high, with roughly 50% of participants reporting that they "strongly agree" that they have gained meaningful insight from their PoP and their students have (or will) benefit from those insights. All four items related to the impact of the PoP received more than 95% ratings of agree or strongly agree.

**Figure 8. Participant ratings of the impact and value of the problem of practice in the end-of-year survey**



**Source:** End-of-year survey (n = 27)

The qualitative evidence also strongly corroborates the impact of PoP. Participants noted that guest speakers and real-world experiences funded through SEI appeared to generate increased student engagement, as one participant explained that being able to purchase research materials and provide field trip opportunities was "transformative" for student learning.

- *We have a kid who's gathering data on heavy metals in rivers... to be able to buy \$50 dollar heavy metal test kits, that's transformative. And then today we went up to the Great Salt Lake and went on a boat tour... to give these kids this experience of being out on the lake for 45 minutes on a boat tour and seeing something very different... is really powerful. (Focus Group)*
- *I have used the money to go take a group of students on various field trips, six different field trips throughout the school year... [SEI] helped me reach as a professional to find something new that*

*I'm passionate about, that I could improve on and help students with, and also provide the funding that it took. (Focus Group)*

Multiple participants described collecting and/or reviewing student data and finding improvements in survey responses and test scores. Participants expressed appreciation for the funding available through SEI and the support they need to tackle problems such as STEM engagement and excitement in their schools and classes. Many participants specifically cited the value of offering real-world connections (through guest speakers or field trips), which contributed to increased interest in STEM careers and helped them see the relevance of their classroom learning.

- *I think for my students, it's just interest in STEM and excitement around STEM... I feel like I've seen students be more excited about it. More interested in it, more interested in what possibilities it might have in their lives and in their future careers. (Focus Group)*
- *It has not only impacted students on skills they need for the classroom but skills that are transferrable to high school, higher ed and in life. My PoP leaked over into my school culture and faculty as well. (Survey)*
- *The impact was, I'm just spending a lot more minutes every day communicating with my ML students about mathematics. They're approaching me, I can approach them... I researched and just realized that if you're willing to demonstrate that you want to communicate to students and you're okay taking out your phone and you're modeling looking for words and looking for ways to communicate with your students, that makes all the difference to them. (Focus Group)*

## **Program Support for Collaboration and Community Building**

This section examines findings related to how SEI supported collaboration among participants and the development of a professional learning community. The analysis focuses on participants' experiences with peer interaction, the value they placed on collaborative learning opportunities, and how these collaborative relationships influenced their teaching practices and professional growth. Data from focus groups and survey responses were analyzed to understand both the strengths and limitations of SEI's approach to fostering collaboration and community among STEM educators.

The findings in this section address the following evaluation questions:

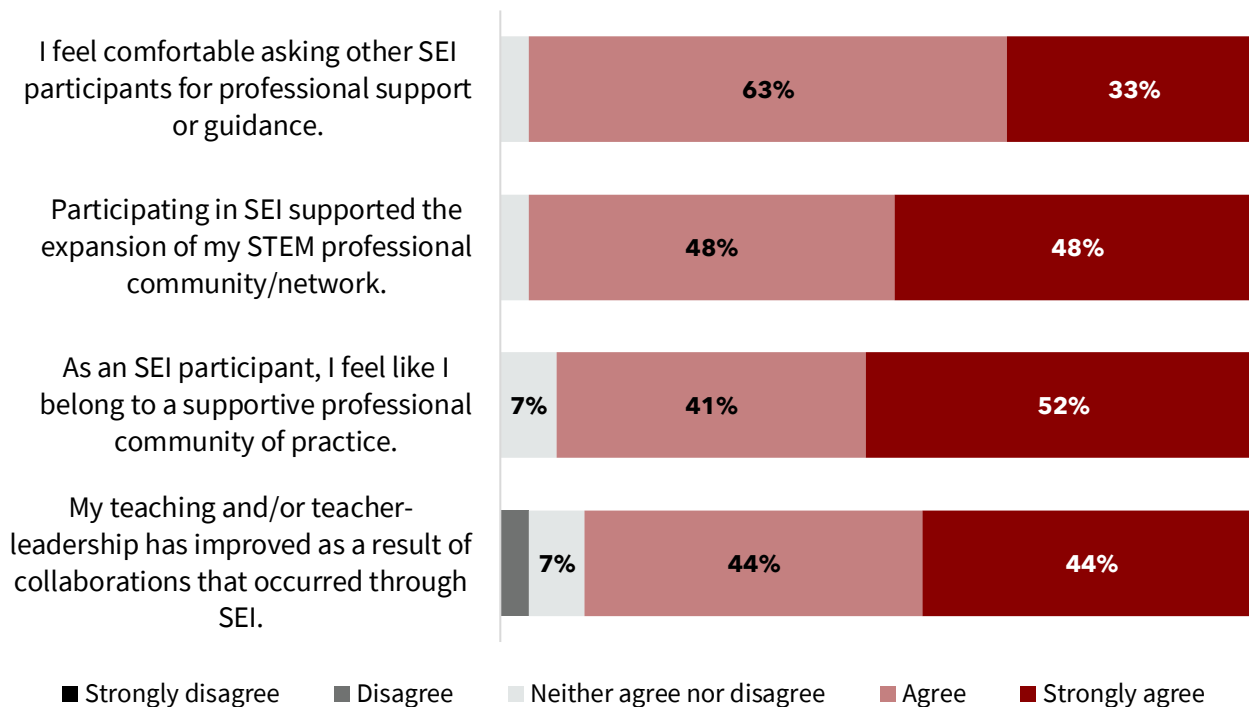
- How did SEI design and implementation support or detract from the quality and impact of participants' experiences?
- In what ways was the SEI implemented as intended and designed to address needs/priorities of participants?

***Participants highly valued opportunities for collaboration in SEI while suggesting that more time and structure in monthly sessions could help maximize peer interactions.***

Strong evidence from focus groups and the end-of-year survey reveals that participants greatly appreciated the collaborative aspects of SEI, consistently identifying peer interactions as one of the most meaningful and impactful elements of their program experience. Many educators noted that peer learning provided practical solutions and professional growth opportunities. Additionally, participants suggested that more structured time for collaboration and clearer pathways for building connections across the full cohort would be beneficial moving forward.

As shown in Figure 9, participants almost universally agreed or strongly agreed with items related to peer learning and community in SEI, including 93% who said they feel like they belong to a supportive professional community of practice. Survey data also indicates that participants feel comfortable asking their SEI peers for support or guidance and that collaborations in SEI have contributed to improvements in the teaching or teacher leadership practices.

**Figure 9. Participant perceptions of belongingness and peer learning**



**Source:** End-of-year survey (n = 27)

Focus group data supported survey findings, providing additional evidence that participants found value in collaborating with peers as part of their problems of practice and in monthly sessions. Many described the time spent reflecting on their PoPs and sharing or receiving feedback from other SEI participants as the strongest component of the program. Participants expressed appreciation for breakout rooms and small group discussions during monthly sessions. Others also cited the annual showcase as a beneficial opportunity for sharing and generating new ideas and gathering feedback.

- *Working with peers that share my ideals and goals is essential to me staying in the program. Knowing that I am not alone in this fight is crucial (Survey)*
- *The biggest asset for me, is not necessarily all the things we're getting from the program... but the cohort itself and communicating with other educators. (Focus Group)*
- *This is by far the best part of the program! Sharing with other participants has given me great ideas to implement in my own practice, and I've received valuable feedback from them as well. I would love to have more time for things like these. (Survey)*

While participants valued existing collaborative experiences, they also noted areas for improvement in program design, including increasing the time spent in discussion with peers and a desire for more intentional pairing strategies.

- *I feel like there are people in the cohort who I've never had the chance to talk to in breakout rooms, and there are people who I spend a lot of time with, which is fine, obviously, but it would be nice. There are some people who I know we've got a couple of nationally board-certified teachers that I've never had a chance to chat with, and I would have loved to have that resource available to me know things like that, which would be nice. (Focus Group)*
- *And as time goes by, it feels like I get less time with people in the cohort rather than more. And so, I would love to build that connection more. And so something where we're visually tracking our interactions, and it can remind me that I have met that person. It might be nine months since I've interacted with that person. (Focus Group)*

***Peer collaboration provided essential professional support and directly influenced teaching practices, with participants applying specific strategies learned from colleagues to their Problem of Practice work and classroom instruction.***

In focus groups and open-ended survey responses, participants suggested that collaborative relationships and discussions with SEI peers served functions beyond information sharing, including providing emotional support and professional validation that sustained participants' motivation, particularly for those who felt a sense of isolation at their schools. Participants described how peer interactions helped them persist in challenging work and maintain enthusiasm for trying new things in their classrooms. The SEI community was especially valuable for participants in school environments where many teachers were resistant to instructional innovation, as SEI participants offered encouragement and normalized the process of trying new strategies.

- *[SEI peers] have also boosted me up when my confidence has been low that I am doing a good job. (Survey)*
- *Having that monthly meeting is really vital for me to just keep trying stuff in my classroom... I think it would be really easy to get discouraged, but just hearing that people are trying things, and it's working well, and it's a process, and you don't have to be perfect on day one, these repeated messages are really powerful for me. (Focus Group)*
- *I have learned a lot from other participants. Reflecting on my PoP with them during breakout sessions really encouraged me to think outside my box of options. I really enjoyed learning what other participants were doing with their PoP which gives me a wider perspective on what I might be able to accomplish at my school. (Survey)*

Collaborative learning in SEI also translated into concrete applications in participants' teaching practice. Some participants' feedback and suggestions directly shaped the implementation strategies for the Problem of Practice. Participants also described adapting ideas across different subject areas and school contexts, applying strategies learned from colleagues in their classroom instruction. These findings demonstrate that SEI's program community functioned as a professional learning network that generated practical improvements and helped sustain their engagement and motivation for innovative practice.

- *One of the things that was brought up was another teacher said, 'Well, you need to advertise your class by way of showing off the exciting things that you're doing so that students want to be involved in it'... Another suggestion that somebody had was about involving younger kids... so I took those suggestions and that was a big part of what I did this year to help with my problem of practice. (Focus Group)*

- *Other people's POPs have directly impacted my teaching... I've had, just even small talk from breakout rooms where I've like, 'I am totally going to use that. I'm totally going to do that. (Focus Group)*
- *I've just been taking ideas, what I've been hearing from other teachers and what they've done, and I've just been like, 'We're going to just take that. We're going to take that and we're run with it.' And to me, as a teacher who creates her own curriculum, that's huge. (Focus Group)*

## Considerations

The following considerations emerged from the findings detailed in this report and reflect participant feedback gathered through surveys and focus groups. These recommendations are offered as guidance rather than intending to be prescriptive, providing actionable strategies that SEI leadership and facilitators might consider as they plan for Year 3 and beyond. The evaluation revealed that SEI has evolved significantly since Year 1, with participants acknowledging substantial improvements in the clarity and flow of monthly sessions, facilitator responsiveness, and more meaningful resources (e.g., guest speakers). Notably, the Problem of Practice work has continued to be central to participants' SEI experience, driving meaningful classroom innovations and increased student engagement. Despite these successes, challenges persist around managing the expanding scope of program expectations and requirements, especially as new components like the NISE Certification were introduced in Year 2. Additionally, while participants demonstrated increased knowledge and confidence in STEM pedagogy and teacher leadership, many continue to find translating these understandings into consistent classroom and school-level practice challenging. These considerations aim to build on SEI's strengths while addressing the areas for improvement to enhance the program's impact.

### ***Continue reinforcing and clarifying SEI's scope, purpose, and expectations as a professional learning program supporting teaching and teacher leadership outcomes.***

While participants recognized meaningful improvements in Year 2 program design and appreciated facilitators' responsiveness, they struggled with the complexity and breadth of program components. The addition of NISE certification requirements and increased intersession work led some participants to feel challenged to meet all program expectations and feel that shifts from month to month were not always clearly connected.

#### **To address these challenges, possible action steps include:**

- **Frontload expectations** as much as possible, providing monthly session agendas and slides ahead of sessions, and consider providing participants with a comprehensive overview of all program requirements and timelines at the beginning of each year
- **Develop a clear program roadmap** that connects all SEI components (PoP, teacher leadership, STEM pedagogy, endorsements and certifications) and explains how they work together toward common goals.
- **Streamline Canvas organization** to reduce navigation barriers and make it easier for participants to find and submit assignments.

### ***Increase focus on supporting educators in implementing strategies and resources related to teacher leadership and STEM pedagogy.***

Participants reported growth in understanding and confidence related to teacher leadership concepts, but many struggled to translate this knowledge into concrete leadership practices. Educators expressed eagerness to develop professional skills, although practical implementation of SEI content remained challenging due to coordination, timing, and curriculum constraints.

#### **To address these challenges, possible action steps include:**

- **Provide further guidance to support capacity building and the implementation of STEM-integrated lessons.** Supports and resources may include a STEM integration planning

protocol, a self-assessment to guide differentiated supports, and continuing to expand the STEM integration resource library with examples of high-quality integrated lesson plans.

- **Provide additional support to help teachers identify opportunities for teacher leadership and overcome school-specific challenges they encounter.** Supports may include office hours with STEM AC staff or breakout room discussions during monthly sessions organized based on educator needs or challenges.

***Increase opportunities for participants to engage with their peers, including providing targeted feedback and generating ideas for moving PoPs forward.***

Collaboration and peer learning were consistently identified as among the most valuable aspects of SEI, with participants expressing strong appreciation for opportunities to exchange feedback and discuss problems of practice with their peers. However, participants requested more structured time for collaboration and better systems for connecting with the full cohort.

**To address these challenges, possible action steps include:**

- **Increase collaborative time in monthly sessions** by allocating more structured time for peer interactions and PoP sharing, potentially reducing presentation time
- **Implement strategic grouping** to ensure participants interact with different colleagues throughout the year (e.g., pairing by subject area, PoP topic)
- **Expand or replicate the annual showcase format** at a smaller scale at other times during the year to provide more opportunities for peer feedback, sharing ideas, and collaborative problem-solving.

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## Appendix A. Logic Model

