2025

Annual Report for the 2024-25 Evaluation of the STEM Action Center's Computing Partnership Grant Program

Prepared for the

STEM Action Center

October 2025

THE UNIVERSITY OF UTAH
UTAH EDUCATION POLICY CENTER

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Bridging Research, Policy, & Practice

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Executive Summary

Study Overview

The Utah Education Policy Center (UEPC) provides this 2024-2025 annual evaluation report of the STEM Action Center's (STEM AC) Computing Partnership (CP) Grant program. This is the second year of the current two-year grant cycle, 2023-2025. The CP Grant program, which continues to be supported by funds allocated through a 2017 Senate Bill 190 (S.B. 190), develops new, innovative computing activities or support the scaling of existing computing activities throughout Utah.

There are three components to the 2024-2025 STEM AC-UEPC collaboration: the annual evaluation, a research study, and development of STEM AC CP impact stories. The UEPC designed this year's evaluation to provide information to the STEM AC about implementation program progress and outcomes for participating educators and students across 17 sites that participated in this grant cycle. The following evaluation questions (EQ), which are organized around focus areas, guided the 2024-2025 evaluation of the STEM AC's CP Grant program.

1. **Grant Program Progress and Influencing Factors.** How and to what extent did participating CP Grant Programs make progress toward their stated objectives and successfully achieve their objectives by the end of the two-year grant cycle? What factors contributed to (i.e., facilitated or hindered) progress and success?

2. **Student Access and Participation in Computing Activities.** How and to what extent did grant program activities support student access to (i.e., via offerings) and participation in computing, computer science, and computational thinking learning experiences?

3. **Educator Outcomes.** To what extent did participation impact how educators value computing and feel confident and competent in their computing knowledge and skills (i.e., the educator outcomes of interest for the STEM AC CP Grant Program)?

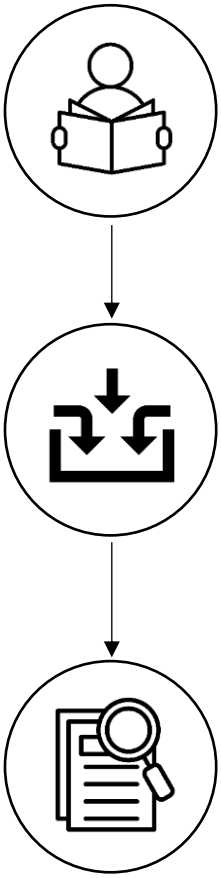
4. **Student Outcomes.** To what extent did participation impact how students identify with computing, report interest and engagement in computing, and exhibit computational thinking skills (i.e., the student outcomes of interest for the STEM AC CP Grant Program)?

5. **Connections between Educator and Student Outcomes.** What was the degree of association between educator outcomes of interest (i.e., valuing of computing and computing confidence and competence) and student outcomes (i.e., computing identity, interest, engagement, and computational thinking)?

In addition to the evaluation described above, UEPC also conducted complementary research addressing questions regarding the role of the STEM AC as an intermediary and how grantee programs promoted the sustainability and scaling of grant-related activities. These research briefs are provided as an addendum to this and provide key insights to support the overarching CP programs' strategic learning and development.

Methods

The UEPC team used a comprehensive, mixed methods design to address the evaluation questions guiding this year's STEM AC CP program evaluation. As outlined below, the evaluation utilized a multiple data sources and analysis strategies to develop results, key findings, and associated recommendations for the STEM AC to guide continuous program improvement.



Research Foundation

The evaluation drew upon current research in computational thinking (CT) and computing education, which emphasizes CT as a critical 21st-century skill applicable across a variety of disciplines. The literature review includes an overview of pedagogical strategies and the importance and challenges of computing and CT-related education. This research foundation supported and informed the overall approach to framing the evaluation questions and to revisit our analyses to guide the development of timely and relevant considerations.

Data Collection

The evaluation was a mixed methods design, collecting both quantitative and qualitative data from multiple stakeholder groups (e.g., site leaders, educators, students) across the 17 continuing CP grantee sites. Quantitative data included grantee questionnaires, educator end-of-year surveys (53 responses from 13 sites), and student surveys (1,860 responses from 10 sites, grades 3-12). Qualitative data included site leader interviews (14 sites), educator focus groups (25 participants across 11 sites), and open-ended survey responses. Taken together, these data provide a comprehensive picture of program implementation and outcomes.

Data Analysis

Consistent with the mixed methods approach, the UEPC team leveraged quantitative and qualitative analysis strategies to analyze the data and generate findings. Quantitative analyses of survey data used a combination of descriptive and inferential statistics to examine program implementation progress, along with measures of educator and student outcomes. Qualitative analyses of interviews, focus groups, and open-ended responses included a multi-step approach of using both deductive codes based on the evaluation questions and research foundation in addition to inductive codes emerging from the data to identify key themes.

Key Findings

The UEPC team developed a set of key findings to capture the results of the 2024-25 evaluation. These key findings highlight core takeaways from the evaluation based on results related to program implementation and the outcomes of participating educators and students during the second and final year of implementation and are summarized below.

STRONG IMPLEMENTATION PROGRESS

Nearly 80% of CP Grant sites reported completing or nearly completing their site-specific objectives, attributing success to flexible program designs and creative resource use. Still, some sites experienced challenges related to staffing and sustainability efforts.

WIDE PROGRAM REACH AND STUDENT ENGAGEMENT

The CP Grant program engaged thousands of students across Utah, with the strongest participation in makerspaces and out-of-classroom programs (e.g., after-school coding clubs, Lego Leagues).

EDUCATORS REPORTED GROWTH AND VALUING OF COMPUTING AND STEM

Educators viewed computing instruction as important for their students and reported meaningful growth in their own interest, confidence, and STEM identity over the course of the year.

OUTCOMES SHAPED BY CONTEXT

Results for educators and students were impacted by contextual factors, including the locale, the content focus (e.g., non-STEM integration), and the nature of grant program activities.

MIXED EVIDENCE OF STUDENT OUTCOMES AND GROWTH

Educators reported that students' hands-on engagement in grant activities supported the development of problem-solving, resilience, and student agency. However, students consistently rated their outcomes and growth lower than educators.

LIMITED ASSOCIATIONS BETWEEN STUDENT AND EDUCATOR OUTCOMES

No statistically significant associations were found, but educators reported learning alongside their students and described how their ability to facilitate cross-curricular integration deepened students' engagement in STEM and computing activities.

Recommendations

Based on these key findings, the UEPC identified recommendations to inform the STEM AC CP program's next grant implementation cycle, which will begin in July 2025. These recommendations offer clear, actionable steps that program staff and participating sites can consider for program improvement, quality implementation, and maximal impact. We recommend that STEM AC, in their critical role as the grant intermediary, support CP grant sites in the following ways:

Offer Technical Assistance and Coaching Opportunities for Sites Off the Wasatch Front

- Educator outcomes were consistently lower at sites off the Wasatch Front than those on the Wasatch Front, suggesting the need for targeted support, coaching, and resource allocation to strengthen implementation capacity and build local buy-in.

Support Sites in Building Educators' Teaching Confidence

- Despite high levels of valuing and interest and enjoyment of teaching computing, technology, and engineering education educators reported lower confidence in teaching computing, suggesting the need for scaffolded training, peer support, and encouragement of growth-mindset teaching practices.

Provide Support for Educators to Integrate STEM with Non-STEM Content Areas

- Educators integrating computing into non-STEM subjects (e.g., ELA, art) showed lower outcomes, indicating a need for targeted integration support, model lessons, and planning guidance to ensure fidelity to computing goals.

Expand Resources Available to Educators Serving Students in Special Education

- While educators at sites including a focus on special education strongly valued computing education, they reported lower enjoyment and confidence in teaching related content, pointing to a need for inclusive instructional resources, peer networks, and training in universal learning design (UDL) and assistive technology.

Promote a Renewed Focus on Student STEM Identity Formation and Computational Thinking Development

- Students reported lower gains in STEM identity and computational thinking skills compared to educators' perceptions of students growth in these areas; hands-on learning, reflective activities, and role modeling can help strengthen these outcomes.

Introduction

The Utah Education Policy Center (UEPC), which has served as the evaluator for STEM AC's grant programs since 2016, conducted the 2024–25 Computing Partnership (CP) Grant Program evaluation as part of a collaborative, research-practice partnership between the STEM Action Center (STEM AC). This report highlights key findings from the second year of the 2023-2024 CP grant cycle. As the CP Grant Program continues to evolve and expand its reach, this year's report documents the implementation and outcomes of sites in their final year of a two-year implementation cycle and informs ongoing improvements and strategic planning for future cycles of the CP Grant Program.

Program Overview

The STEM AC's CP Grant Program provides financial and programmatic resources to districts and schools to expand access to high-quality computing, computer science, and computational thinking opportunities for students across Utah. Since it was established in 2017 through Senate Bill 190 (S.B. 190), the CP Grant Program has continued to support the development of innovative initiatives in these fields that address local needs and gaps in computing education and are tailored to the needs of students at participating schools and districts.

During the 2024-25 AY, the CP Grant Program funded 25 grant sites. These sites included 17 sites in their second year of implementation and eight new sites. Since the eight new programs were systematically different from the continuing sites concerning their degree of implementation, data collected about these grant program sites were excluded from the results presented in this annual report. Instead, the UEPC team provided the CP Grant Program Manager with an internal memo summarizing data about the implementation and outcomes of these specific sites. Participating grant programs continued to focus their implementation on various grant activity areas, including Pre-K Enrichment, Makerspaces and Maker Learning, Out-of-Classroom Experiences, Summer Camps and Activities, Near-Peer Mentorship, and Work-Based Learning Experiences. We offer descriptions of each of these grant activity areas in Appendix A.

Evaluation Overview

The UEPC has a rich history of partnering with the STEM AC to support research and the evaluation of their grant programs and has evaluated the CP Grant Program since its establishment in 2016. This year's evaluation and related research draws upon UEPC's deep understanding of the STEM AC and the CP Grant Program that has been developed through years of collaboration and our commitments to: promoting inquiry and shared understanding, building and sustaining trust, promoting effective communication and coordination, respecting the expertise and experience of our partners, and advancing continuous improvement through research insights (Rorrer et al., 2025).

With these commitments in mind, this year's evaluation focuses on the second and final year of the current two-year grant cycle (i.e., the 2023-2025 FY). It identifies key insights about implementation and outcomes that can inform future CP Grant Program cycles. As was the case with last year's evaluation process, this year's evaluation provides insight into program implementation, outcomes, and future considerations.

Report Overview

This UEPC annual evaluation report begins with an overview of relevant literature, which expands upon the literature summarized in last year's evaluation report to include new developments in computing education, additional information about the role of intermediaries supporting these types of initiatives, and promising practices to support the scaling and sustainability of PK-12 educational programs with a similar focus. The evaluation and research questions that guided this year's inquiry are then presented, along with an overview of the data and methods used to address these questions. The next section of the report presents findings related to the guiding questions before turning to recommendations for future grant cycles based on insights from this year's study.

Relevant Literature

This review of relevant literature builds upon the UEPC team's 2023-2024 literature review for the CP evaluation. Each section begins with a summary of previously discussed insights before turning to those from newly reviewed literature. Using this framing, we draw attention to what was previously established about computational thinking (CT), pedagogical strategies, and barriers to access, as well as new contributions to the literature shaping our current understanding of the program.

Foundations of Computational Thinking in K-12 Education

Our previous review emphasized the importance of integrating computational thinking (CT) into K-12 education as a critical 21st-century skill that has continued to grow over the last few decades (Angeli & Giannakos, 2020; Wing, 2006, 2008). CT was described both as a universally applicable problem-solving orientation (Swaid, 2015) and as "problem-solving using concepts fundamental to computer science" (Wing, 2006, p. 33). Core CT competencies identified in the literature included skills like problem decomposition, abstraction, algorithmic thinking, and generalization (Barr & Stephenson, 2011; Kukul & Karatas, 2019; Rode et al., 2015). The review also emphasized how CT connects to students' computing identity (i.e., interest, belonging, and recognition) and the importance of connecting computing activities to students' lives and social issues (Iversen et al., 2018; Lunn et al., 2021; Ryoo, 2019). CT was also noted as a way to build confidence and persistence in STEM fields more broadly(Carlone & Johnson, 2007; Lu & Fletcher, 2009; Oyserman, 2015).

Recently reviewed literature continues to advance the understanding of CT as a cross-disciplinary skill that supports problem-solving across various contexts and strengthens students' STEM identities. Studies show that introducing CT through meaningful, age-appropriate activities can enhance interest, confidence, and self-efficacy (Sun & Liu, 2024). Evidence from extracurricular robotics programs demonstrates how sustained engagement with CT supports both skill development and broader participation in computing pathways (Merino-Armero et al., 2023). This body of work underscores that CT is not only an academic competency but also a foundation for fostering long-term engagement in STEM learning.

Pedagogical Strategies to Promote Computational Thinking

Our earlier review emphasized the importance of introducing CT skills early to build confidence and persistence (Lu & Fletcher, 2009; Su & Yang, 2023). It also noted that while age-appropriate instructional activities hold promise for promoting CT, educators face challenges ensuring rigor and

measuring outcomes (Su & Yang, 2023). Our review also pointed to the need for professional learning and organizational support to help teachers integrate CT into classroom practice (Barr & Stephenson, 2011; Leyzberg & Moretti, 2017; Ni et al., 2021).

Recent studies add more nuance to what effective CT instruction looks like. Research shows that activities built around creativity and design can help students strengthen CT skills (Israel-Fishelson & Hershkovitz, 2024), while flipped classrooms give students more opportunities for interactive, hands-on learning (Gao & Hew, 2022). Peer scaffolding has also proven beneficial, with older and younger students working together to support each other's learning (Kyza et al., 2022). Evidence from multi-year extracurricular robotics programs demonstrates the value of sustained engagement, showing that extended opportunities are more impactful than short-term exposure (Merino-Armero et al., 2023). At the same time, delivery mode matters: unplugged activities can be especially effective for younger learners (Sun & Liu, 2024), while robotics-based activities often show stronger effects overall (Zurnacı & Turan, 2024). Collectively, these studies highlight that effective CT pedagogy requires learning experiences that are creative, interactive, collaborative, and sustained, while also being tailored to the developmental needs of students.

Challenges and Barriers in Computing and CT-Related Education

Our prior review also underscored persistent barriers to equitable access in computing education, highlighting systemic obstacles to students' access to computing opportunities (Google Inc. & Gallup Inc., 2015; Qazi et al., 2020). It also highlighted how educators often lack sufficient training and support to integrate CT effectively, and schools struggle to sustain programs without external resources or partnerships (Papini et al., 2017).

Recent work reinforces these challenges while offering more detailed descriptions of the barriers that continue to shape student access to CT learning. Specifically, Sun & Liu(2024) show that while unplugged programming can spark interest and confidence, not all students have consistent access to this programming or follow-up opportunities to build on initial exposure. Furthermore, Merino-Armero et al 2023) highlight how access to multi-year robotics programs can bridge some of these gaps in access. Other studies provide new insights related to challenges faced by educators. In particular, Miller-Rushing & Brasili (2024) point out that teachers need professional development that is both flexible and responsive to diverse classroom contexts, while Park et al. (2024) emphasize that early childhood educators often lack the training and resources needed to introduce CT effectively. Collectively, these studies highlight that while progress is being made, gaps in access, support, and resources continue to constrain equitable participation in computing education.

Study Design

This year's UEPC evaluation of the STEM AC Computing Partnerships grant program was guided by complementary sets of evaluation and research questions. While the evaluation questions addressed program implementation and outcomes, the research questions sought to explore and extend our understanding of additional dimensions of the program to inform future evaluation cycles more broadly. We addressed these research questions separately in the research briefs the UEPC team provided. These questions focused on developing a better understanding of (1) STEM AC's role as an intermediary to support computing education practices and resources in the state and (2) how sites promoted the scaling and sustainability of the programs implemented through this grant program.

The following evaluation questions (EQs) guided the 2024-2025 evaluation of the STEM Action Center's Computing Partnership Grant Program. The evaluation focused on implementation progress across participating sites as well as the outcomes of participating educators and students.

1. **Grant Program Progress and Influencing Factors.** How and to what extent did participating CP Grant Programs make progress toward their stated objectives and successfully achieve their objectives by the end of the two-year grant cycle? What factors contributed to (i.e., facilitated or hindered) progress and success?

2. **Student Access and Participation in Computing Activities.** How and to what extent did grant program activities support student access to (i.e., via offerings) and participation in computing, computer science, and computational thinking learning experiences?

3. **Educator Outcomes.** To what extent did participation impact how educators value computing and feel confident and competent in their computing knowledge and skills (i.e., the educator outcomes of interest for the STEM AC CP Grant Program)?

4. **Student Outcomes.** To what extent did participation impact how students identify with computing, report interest and engagement in computing, and exhibit computational thinking skills (i.e., the student outcomes of interest for the STEM AC CP Grant Program)?

5. **Connections between Educator and Student Outcomes.** What was the degree of association between educator outcomes of interest (i.e., valuing of computing and computing confidence and competence) and student outcomes (i.e., computing identity, interest, engagement, and computational thinking)?

Data Collection

Similar to last year, the UEPC team used both qualitative and quantitative methods to gather information about the implementation and outcomes of the CP Grant Program and address the questions guiding this inquiry. The following sections provide a summary of the purpose and process

of these methods as well as the sample of data gathered via these methods. The table in Appendix B aligns each of these methods with the questions that guided this inquiry by identifying which sources were used to answer which questions.

Grantee Questionnaires

Purpose & Process. The UEPC grantee questionnaires collected information on the progress schools or LEAs made towards their program objectives and the focus of their grant activities, including student participation, resource adequacy, and alignment with the overarching goals of the STEM AC CP Grant program. This questionnaire also allowed site leaders to share feedback on STEM AC's support for program implementation and growth. In their responses, site leaders provided open-ended reflections on key successes and challenges related to the implementation of their grant-support programs and the associated outcomes of these efforts during the 2024-25 AY. This questionnaire was administered in December 2024 to gather information about grant activities implemented in Fall 2024 and in April 2025 for implementation information for Spring 2025.

Sample. All 17 of the site leaders in their second year of implementation completed the Fall 2024 Grantee Questionnaire, and 14 of the grant programs that had program activities during the Spring 2025 reporting period completed the Spring 2025 Grantee Questionnaire. The three sites that did not provide responses did not have activities during the reporting period and solely focused on activities that were implemented during the summer. Just under half (47%) of the site leaders who were invited to complete these questionnaires on behalf of their site served as LEA-level administrators, while others worked as subject or content area specialists (e.g., Math, Science, or STEM Specialists) (24%), school administrators (6%), staff at partner organizations (i.e., 4H Extension) (12%), grant managers (6%), classroom teachers (6%), or school administrators (6%).

Site Leader Interviews

Purpose & Process. Leadership at all participating grant sites were invited to participate in interviews/focus groups to better understand how they interacted with the STEM AC during implementation and their efforts to scale and sustain their programs beyond the two-year grant cycle. Site leaders helped the evaluation team identify other key leaders at their site and coordinate the logistics of these sessions. These discussions were held virtually via Zoom in December 2024, lasted between 15.12 and 42.57 minutes, and were audio-recorded for transcription and analysis.

Sample. The UEPC evaluation team conducted interviews and focus groups with site leaders at participating STEM AC CP grant sites to understand their interactions with the STEM AC and how STEM AC has served as an intermediary supporting their work during the two-year grant cycle and to understand scaling and sustainability efforts across CP grantee sites. Leaders from 14 or 82.3% of the 17 CP Grant programs participated in recorded videoconference interviews with representatives of the UEPC evaluation team in the middle of the second and final year of grant implementation.

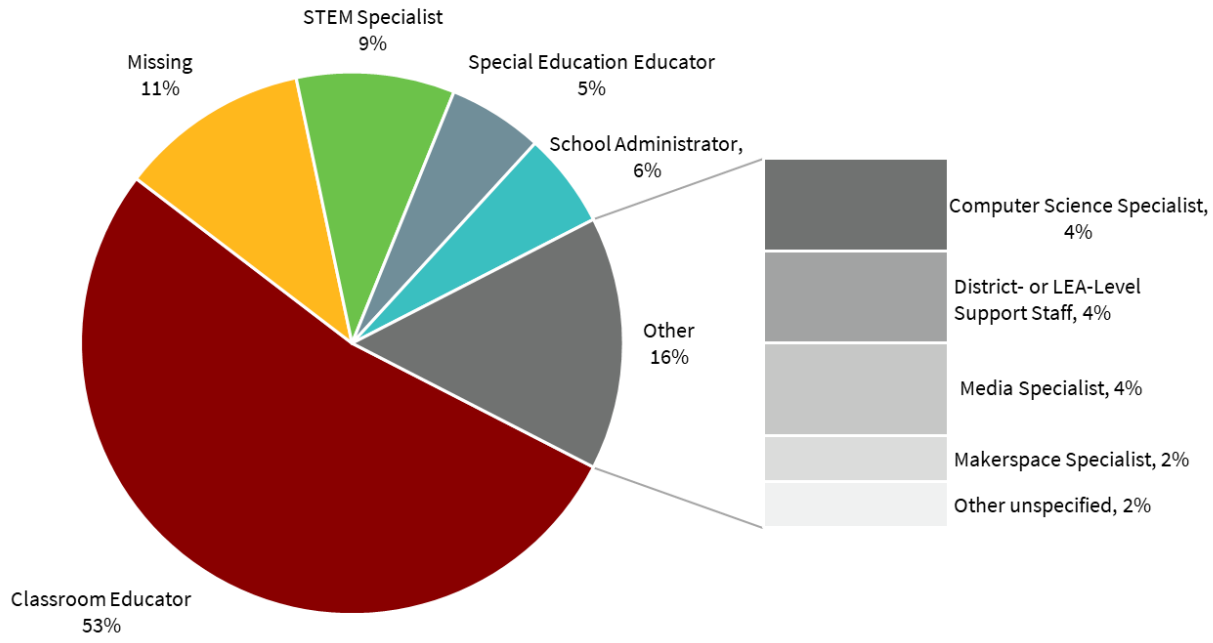
Educator End-of-Year (EOY) Survey

Purpose & Process. The UEPC team administered a survey to educators who supported the implementation of the grant-supported activities during the 2024-25 AY to gather information about how these activities have impacted their students' interests, skills, and identities in computing and how the experiences influenced their beliefs and confidence in teaching these subjects. Specifically, in

addition to asking educators to provide ratings of these effects, respondents were invited to share their insights via open-ended responses about perceived successes and challenges related to the activities they supported. This survey was distributed via email through Qualtrics in April 2025. The STEM AC offered participants a $10 Tango gift card, allowing them to choose a voucher from various retailers.

Sample. Responses from 53 educators (overall response rate 34.9%) from 13 of the 17 CP programs in their second year of implementation were included in the analyses (site-level response rates ranged from 0 to 66.7%).[1] Figure 1 shows that respondents were mostly classroom educators, though they also included a range of related professional roles across sites. Of the educators included in the analytic sample, 30 or 56.6% were from grant programs located off the Wasatch Front. See Appendix C for additional details about the sample and Appendix D to see which grant programs were located on and off the Wasatch Front.

Figure 1. Educator EOY Survey Respondent Roles



Source: Educator EOY Survey

Educator Grant Activity Focus Groups

Purpose & Process. As was done during last year's evaluation, the UEPC conducted a series of focus groups with educators who supported the implementation of grant-related activities. During these sessions, we asked educators to share their reflections on student engagement and interest in

[1] This sample intentionally did not include the 8 new programs in their first year of implementation during the 2024-25 AY for two primary reasons. First, they are in a substantially place in their implementation process less than one year in and not comparable to sites who have been implementing the CP program for the past two years. Second, perhaps due to their relative newness, only 3 of the 8 new sites participated in the survey which would limit the extent to which separate analyses or generalizations across sites could be drawn.

computing, computer science, and computational thinking activities, and how they identified with these activities or fields. Additionally, the UEPC team asked educators to share their motivation for supporting these activities, their confidence in leading grant-related activities, and reflections on their own learnings, capacity building, and the sustainability of CP activities at their site. These sessions were held virtually via Zoom in February and March 2025, lasted between 24 and 45 minutes, and were audio recorded for transcription and analysis.

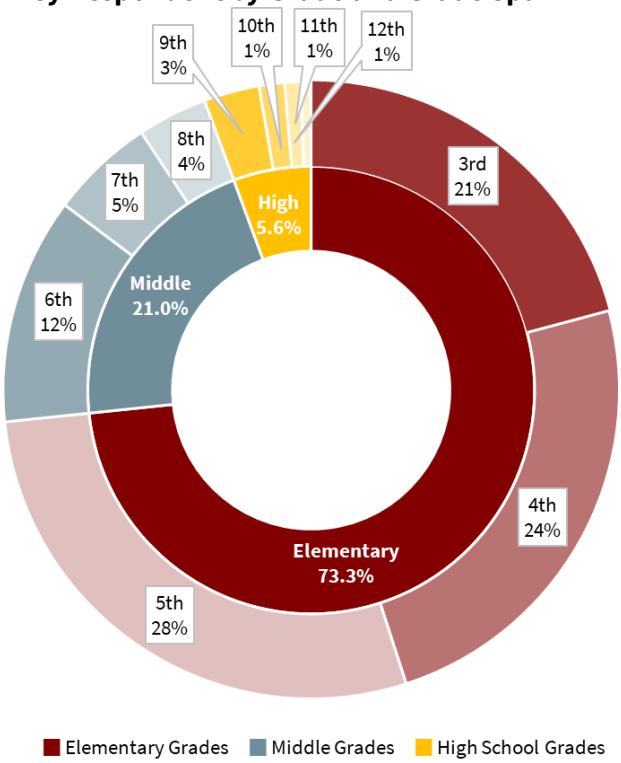
Sample. The UEPC evaluation team conducted 10 focus groups with 25 educators across 11 STEM AC CP Grant program sites. Focus group sessions included between one and six participants and ranged from 24 to 45 minutes in duration (average of 35 minutes). The majority (52%) of participants in the focus groups were PK-12 teachers involved in directly implementing STEM activities supported by the CP Grant program. Other focus group attendees included school- and district-level STEM specialists and coordinators, instructional assistants, and other community partners who were also involved in supporting grant-related STEM activities.

Student Survey

Purpose & Process. As was the case during the first year's evaluation, sites administered the UEPC Student Survey to students in grades three and above who participated in grant-supported activities, and was used to assess changes in students' computing interest, identity, and computational thinking. We provide details about the items on this survey and the reliabilities of these scales in Appendix E. To increase participation in this year's survey, the UEPC partnered with site leaders to administer the survey on a continual basis throughout the 2024-25 AY as students completed their engagement in specific grant-funded activities. Also, prior to administration, the UEPC consulted with site leaders to ensure that they received permission from key individuals at their site to proceed with the administration. This process included sharing a test survey link and an informational letter about the survey to site leaders that could be shared in advance of administration as well as the formal certification from site leadership that the UEPC had permission to proceed with the survey administration. Once granted this permission, each site was given a unique anonymous link for administration. This distribution method allowed the evaluation team to identify which responses were from which sites, while still protecting the anonymity of student respondents within sites.

Sample. In total, 15 or 88% of the 17 CP Grant program sites secured permission to administer student surveys at their site and administered surveys to students who participated in grant-supported activities at their school, district, or agency during the 2024-25 AY. Of these, 10 or 59% of all of the participating sites had at least some students respond to the survey, with the total number of students ranging from 9 to 886 student responses across sites. It is important to note that approximately 94% of all student responses came from three of the largest grantee programs (i.e., Canyons County School District (SD), Murray City SD, and South Sanpete SD), see Appendix F. As seen below in Figure 2, nearly three-quarters of participating students were enrolled in elementary grades (3rd through 5th), with another 21.0% enrolled in middle school grades (6th through 8th), and just 5.6% in high school, monotonically decreasing from 9th through 12th grade.

Figure 2. Student EOY Survey Respondent by Grade and Grade Span



Source: Student EOY Survey

Data Analysis

Defining Meaningful Differences: Interpreting the Findings of this Report

Throughout the report we identify both statistically significant and *meaningful differences* (i.e., substantive changes or differences within the context of the STEM AC CP program). A difference equal to or greater than 0.2 standard deviations was considered meaningful, a commonly accepted definition. This approach supports interpretation so that readers can distinguish between changes that are (or are not) statistically detectable and those that represent meaningful changes or differences in participant outcomes even when underpowered to detect a statistically significant difference or when a statistically significant difference is too small to have practical meaning within context.

Quantitative Analyses

The UEPC evaluation team used descriptive and inferential statistics to analyze quantitative data collected from the Grantee Questionnaires, Educator EOY surveys, and Student Surveys. As described in the previous sections, each survey contained sets of items we used to generate composite scores to better represent underlying constructs measured by the instruments.[2] In alignment with last year's analysis approach, composite scores were calculated for each scale by averaging respondents' ratings

[2] The reliabilities of the scales on these instruments and the associated descriptive statistics for the items in each scale are included in Appendix E. Note, that we do not report scale reliabilities for the Grantee Questionnaires due to insufficient sample size (n = 17, 14) to estimate reliabilities.

across all relevant items in a scale. We repeated this process for both the end-of-year and the retrospective ratings representing respondents' perspectives at the start of the academic year. We conducted statistical tests to compare average ratings over time on educator and student outcomes. Further details on quantitative data analysis methods are embedded within relevant sections of the findings.

Qualitative Analyses

The UEPC team gathered qualitative data via the CP Grant Manager Interviews, Site Leader Interviews, Grant Activity Focus Groups, and open-ended responses provided by respondents in both the Grantee Questionnaires and the Educator EOY Surveys. We employed a multi-step approach to qualitative analysis. We developed an initial codebook using deductive categories based on the questions guiding this year's evaluation and associated literature. Examples of these inductively identified codes included categories of educator outcomes such as computing skills and STEM teaching confidence; categories of pedagogical approaches used to provide computing instruction, such as active learning and student agency; and categories of student outcomes such as skill development and computing identity.

During the first coding round, three UEPC evaluation team members applied these initial codes to the same select set of transcripts from site leader surveys, while remaining open to inductive codes that emerged from the data (Saldaña, 2016). The coders then met to reconcile differences in understanding and to determine if new codes should be added to a revised version of the codebook. We then used the revised codebook to analyze the remaining qualitative data. During the entire coding process, the UEPC coders remained open to emergent codes and themes emerging from the data.

Once the evaluation team coded all data, we met to identify key themes within each data source and interpret them in the context of the CP Grant program and the guiding questions of this inquiry. Themes were derived separately for each data source to ensure that findings accurately reflected the perspectives captured through each data collection method. In the findings section, these themes, along with representative quotes, are presented by data source.

Key Findings & Results

This section provides key findings and results from the 2024-25 annual STEM AC CP Grant program evaluation. To support the interpretability and actionability of this year's results, we begin by presenting the five key findings that consider results across evaluation questions to draw attention to core takeaways from the results of this year's evaluation. More detailed discussion of the results follows these key findings and are organized according to the evaluation questions that guided our inquiry. The results section begins with program implementation (EQ1) and student engagement (EQ2), including progress ratings, site leaders' reflections on successes and challenges experienced, and a summary of student engagement in grant-supported activities. This is followed by results we identified from the analysis of educator outcomes (EQ3), student outcomes (EQ4), and an exploration of associations between educator and student outcomes (EQ5).

Key Findings

While the detailed results directly address the evaluation questions, we first highlight a set of six key findings that the UEPC identified as exemplifying what was most compelling among the results of 2024-25 annual evaluation of the CP Grant program. As shown in Table 1, these key findings synthesize results across the evaluation questions to identify central takeaways about program implementation, student access and engagement, educator outcomes, student outcomes, and potential connections between educator and student outcomes. Together, these key findings provide a high-level summary of the progress made and participant outcomes as the program concludes the two-year grant cycle.

Table 1. Alignment of Key Findings to Evaluation Questions

Key Finding	EQ1: Grant Program Progress and Influencing Factors	EQ2: Student Access and Participation in Computing Activities	EQ3: Educator Outcomes	EQ4: Student Outcomes	EQ5: Connections between Educator and Student Outcomes
Strong Implementation Progress	✓				
Wide Program Reach and Student Engagement		✓			
Educators Valued and Reported Growth			✓		
Outcomes Shaped by Context			✓	✓	
Student Growth and Opportunities				✓	
Limited Associations Between Educator and Student Outcomes					✓

To make the key findings more accessible, Figure 3 provides a visual summary and short descriptive narratives that provide high-level summaries. We follow this figure with supporting evidence to substantiate each key finding based on the evaluation results. This structure balances clarity with depth to succinctly communicate the overarching story of the findings while also providing nuance and detail about the evaluation results that informed these findings.

Figure 3. Key Findings from the 2024-25 CP Grant Evaluation

Strong Implementation Progress

- Sites reported that nearly 4 out of 5 of their objectives were complete or nearly complete by the end of the two-year cycle.
- Site leaders attributed success to flexible program designs, creative resource use, and targeted outreach that broadened student access and participation.
- Access to professional-grade equipment (e.g., robotics kits, 3D printers) enabled students to engage in novel and authentic learning experiences.
- Persistent challenges remained in relation to staffing capacity and concerns about the long-term sustainability of programming.

Wide Program Reach and Student Engagement

- The CP Grant program engaged thousands of students across Utah through participating sites during the second and final year of the current grant cycle.
- Over 90% of students who participated in grant-supported programs did so in out-of-classroom experiences (e.g., after-school robotics and coding clubs) or makerspace and maker learning opportunities.
- Makerspaces and maker learning stood out as highly popular and effective entry points for engaging students in STEM and computing-related activities.
- Student engagement trends showed a shift in focus toward out-of-classroom activities across the 2024-25 academic year.

Educators Reported Growth and Valuing of Computing and STEM

- Educators strongly valued computing and STEM education, as well as general enjoyment and interest in teaching this content.
- Educators' confidence ratings were relatively lower than other outcomes but still showed meaningful growth over the year.
- Many educators described learning alongside their students, embracing "productive failure," and a greater ability to integrate STEM and computing effectively into their teaching practices.
- Participation in CP activities supported the development of educators' STEM identities and increased their capacity to provide their students with engaging STEM and computing learning opportunities.

Outcomes Shaped by Context

- Variations in educator and student outcomes across sites suggest that both program locale (i.e., on or off the Wasatch Front), content focus, and design shape educator and student experiences in meaningful ways.
- Educator outcomes varied across sites, with those on the Wasatch Front (i.e., in less rural settings) and those at sites offering makerspaces and maker activities reporting the strongest outcomes (i.e., valuing of computing education, interest/enjoyment in teaching this content, confidence teaching this content)
- Educators at sites that included a focus on integrating non-STEM subjects (e.g., ELA, art) with grant activities reported meaningfully lower outcomes across all measures.
- For students, outcomes also varied by site, with students off the Wasatch Front (i.e., those in more rural settings) rating their STEM identity and interest higher than those on the Wasatch Front.

Mixed Evidence of Student Outcomes and Growth

- Educators reported that students' hands-on engagement in grant activities supported problem-solving, resilience, and ownership of their learning.
- Educators highlighted the ways in which many students took on leadership roles in clubs and makerspaces, supporting their peers, their instructors, and program momentum.
- Students' self-ratings on outcome measures were consistently lower than educators' ratings of their students on these same outcomes, particularly in STEM identity.
- Middle school students reported significantly weaker STEM identity compared to both younger and older peers.

Limited Associations Between Educator and Student Outcomes

- There were no statistically significant associations found between educator and student outcomes across sites.
- Small sample sizes and the complexity of site-level differences limit the ability to statistically detect an association between quantitative outcomes if one does exist.
- Qualitative evidence from educator reflections demonstrated meaningful reciprocal learning, where educators' growth in confidence and flexibility created space for student autonomy, ownership, and leadership.
- Educators described how their ability to engage students in activities that included cross-curricular integration deepened students' authentic engagement in STEM and computing activities.

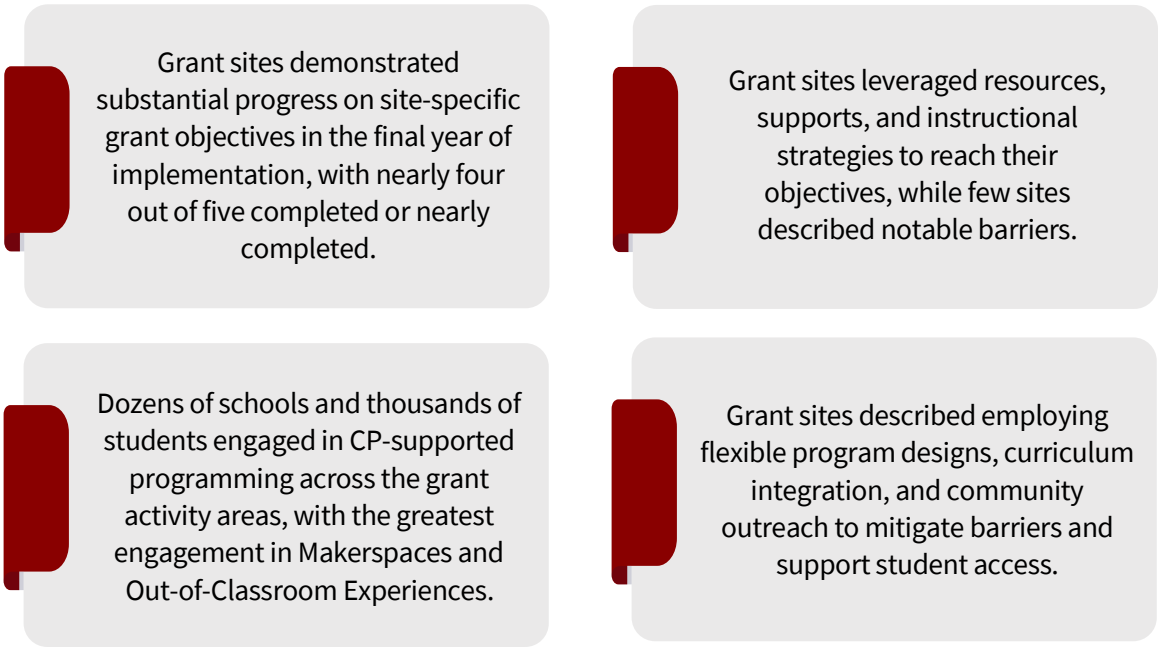
Results

This section includes detailed discussions of the results that informed the key findings. We organize these results around the evaluation questions. They begin with results related to program implementation (EQ1) and student engagement (EQ2), including progress ratings, site leaders' reflections on successes and challenges experienced, and a summary of student engagement in grant-supported activities. Followed by results emerging from the analysis of educator outcomes (EQ3), student outcomes (EQ4), and an exploration of associations between educator and student outcomes (EQ5).

Program Implementation and Student Engagement

To better understand the reach and success of the CP grantee program implementation during the 2024-25 AY, the UEPC analyzed site reports on progress toward site-specific objectives, documented successes and challenges, and examined the reach of grant-supported programs, including the nature of activities implemented and the number of students engaged. Figure 4 below offers an overview of these main results regarding program implementation. The following sections then provide a more detailed discussion of program implementation scope, progress toward stated goals, and key factors that supported or hindered successful implementation during the 2024-25 academic year.

Figure 4. Overview of Results for STEM AC CP Program Implementation and Student Engagement



Grant sites demonstrated substantial progress on site-specific grant objectives in the final year of implementation, with nearly four out of five completed or nearly completed.

Our analysis of CP Grantee Questionnaires from all 17 grant sites showed steady progress toward their site-specific objectives across the 2024-25 AY. The UEPC evaluation team only used the most recent progress ratings in reporting and analysis. These sites reported working toward 47 site-specific objectives during the 2024-25 AY. As shown in Figure 5, our analysis found that most site-specific objectives were completed (70%) or nearly completed (9%), indicating that sites made substantial progress toward their planned objectives during the 2024-25 AY. While this reflects strong overall implementation, the small proportion of objectives that remained only partially complete points to ongoing challenges that we describe in later sections. Specifically, qualitative data from site leaders' reflections about their progress this academic year provides further insight into successes and challenges experienced by participating CP grant programs.

Figure 5. Reported Progress Towards Sites' CP Goals (2024-25 AY)

Sources: UEPC Fall 2024 and Spring 2025 Grantee Questionnaires

Grant sites leveraged resources, supports, and instructional strategies to reach their objectives, while few sites described notable barriers.

In surveys administered in the fall of 2024 and spring of 2025, the UEPC team asked site leaders to describe key successes related to the completion of their objectives and factors that contributed to their successes. We also asked them to share challenges or barriers they experienced while working toward their objectives. All 17 sites provided responses about their successes in the fall and 14 of the 17 provided responses in the spring. For each survey, many site leaders shared successes for multiple objectives, resulting in a total of 84 responses (45 in the fall and 39 in the spring) across both surveys for analysis. In contrast, we received only six responses related to barriers from three sites. This limited data suggests that sites were generally successful in reaching their objectives. To provide examples of barriers and challenges to implementation, however, we also analyzed site leader focus groups to supplement survey responses and better understand challenges across sites. While focus groups provided further evidence of the achievement across sites, the analysis identified two barriers worth noting.

Descriptions of key successes and barriers are included below, along with example quotes from survey responses and focus groups. Analysis revealed site leaders attributed successes to the availability of resources and equipment (e.g., 3D printers, robotics kits), the provision of supports to increase access for a wide range of student participants, and promotion of student agency and hands-on learning. Barriers included finding and retaining educators to teach computing course and sustaining funding amid an array of competing priorities within their schools and districts.

Successes

Resources and equipment: Across both surveys, site leaders stated that access to professional-grade tools, robotics kits, 3D printers, and other technology enabled them to offer authentic, engaging experiences for students that wouldn't otherwise be possible. Data shows that sites developed systems for maintenance and training to support sustainability, while students often took ownership of equipment care and trained their peers.

- *Grant funds have made it possible for us to have up-to-date hands-on equipment for students. Computer Science Specialists… keep the district informed on what is needed to keep each makerspace well-stocked for the benefit of students. (Spring 2025 Grantee Questionnaire)*
- *Our key successes have been specifically in gathering equipment for this after-school program. We now have what we need... We have 12 students who stay after school for the robotics club. This is mainly due to the acquisition of equipment. (Spring 2025 Grantee Questionnaire)*
- *We have been able to purchase various equipment and supplies to create robust programs at our locations. Teacher excitement and willingness to jump in and try new things with students has greatly impacted the success. (Fall 2024 Grantee Questionnaire)*

Intentional supports to expand access: Site leaders reported successes in reaching underserved populations and removing barriers to participation, including targeted outreach to English Language Learners, provision of transportation, and strategic partnerships with

- *Staff personally invite ELL students and their families to participate in afterschool STEM programs during parent-teacher conferences, providing one-on-one explanations of opportunities and program benefits. All flyers and informational materials are translated into both English and Spanish to ensure clarity and accessibility. (Spring 2025 Grantee Questionnaire)*
- *Over half our participants are eligible for free or reduced lunch and ALL are rural. (Fall 2024 Grantee Questionnaire)*

community organizations. The emphasis on serving rural, low-income, and traditionally underrepresented students was consistent throughout responses.

- *We successfully supported nearly 1,000 elementary students and over 550 middle school students in engaging, hands-on makerspace experiences. Funding played a crucial role in incentivizing facilitators and supplying essential materials to bring these spaces to life. (Spring 2025 Grantee Questionnaire)*

Student agency and hands-on learning: Surveys indicate that students often took ownership of their learning, ranging from student-run broadcasting teams to robotics competitions to entrepreneurial ventures where students designed and sold their creations. The spring survey data particularly emphasized how programs evolved to give students more autonomy and leadership roles.

- *The equipment acquisition clearly prioritized versatility and professional-grade tools that provide authentic experiences… student projects like yearbook creation, film animation, and… product development. (Spring 2025 Grantee Questionnaire)*
- *[Students are] creating things that they sell during their boutique to earn money to replace supplies and maintain equipment. (Spring 2025 Grantee Questionnaire)*
- *Students have been responsible for most maintenance…They were great at keeping up with our checklist and following it... Watching students use their skills and the engineering design process to solve problems. (Spring 2025 Grantee Questionnaire)*

Barriers

Personnel and capacity constraints: The primary barrier described by site leaders was the challenge of finding, training, and retaining educators to implement computing programs. Site leaders noted examples of teacher reluctance due to fear or lack of confidence, insufficient time for professional development, and demanding workloads for site leaders who often wore multiple hats while managing these grants.

- *So, teachers were pretty much on their own. I can take the blame, but I'll just say that those hats that I wear take precedence sometimes... my time and energy really limits that. I'll just say that. (Site Leader Interview)*
- *It's very intimidating going into a classroom…. It's really threatening to try to introduce a technology without being super familiar with it and super comfortable with it into a classroom. (Site Leader Interview)*
- *I think I may have been able to get [staffing for] all schools, but when I'm having to pull from the exhausted teachers and facilitators that are already in the building, that's a lot harder. (Site Leader Interview)*

Sustainability and resource allocation: Many site leaders described struggles with managing and sustaining funding and resources, compounded by competing educational priorities and political pressures. Site leaders shared examples of facing uncertainty about continued funding while simultaneously dealing with district-level

- *Unfortunately, STEM Action Center grants don't help with the sustainability piece. They're a year-by-year grant writing opportunity... The most important one is going to be the legislative ask... That's where the sustainability comes in, because I'm very close to retirement and as soon as I leave, this program stops. (Site Leader Interview)*
- *And there's so much emphasis on literacy as a subject from legislators from USBE... that there's no room or space for anything else. There's no room or space for math. There's no room or space for science... (Site Leader Interview)*

pressures to prioritize other initiatives not directly supported by CP programs.

- *So, we haven't had any conversations specifically with the school district about moving forward. We have talked to a couple of businesses about sponsoring. We definitely want to keep the program going. If the grant funds aren't available in any capacity, there's no way that we could sustain the level of participation that we have. I think it costs... about $18,000. So we don't have anybody that can take over that. (Site Leader Interview)*

Dozens of schools and thousands of students engaged in CP-supported programming across the grant activity areas, with the greatest engagement in Makerspaces and Out-of-Classroom Experiences.

On the fall and spring Grantee Questionnaires, site leaders were also asked to provide information about the number of schools and students they engaged in each of the seven grant activity areas (i.e., Pre-K Enrichment, Makerspaces and Maker Learning, Out-of-Classroom Experiences, Summer Camps and Activities, Near-Peer Mentorship, and Work-Based Learning Experiences). Table provides a summary of the total school and student counts reportedly engaged during the second year of implementation.

Table 2. Number of Schools & Students Engaged in CP Grant Activities (2024-25 AY)

Grant Activity Area	Summer 2024 (June-July 2024)		Fall 2024 (Aug.-Dec. 2024)		Spring 2025 (Jan.-Apr. 2025)	
	Schools	Students	Schools	Students	Schools	Students
Pre-Kindergarten Enrichment	—	—	3	290	0	0
Makerspaces and Maker Learning	—	—	42	6,829	49	7,494
Out-of-Classroom Experiences	—	—	57	2,237	50	2,893
Summer Camps & Activities	39	65	—	—	—	—
Near-Peer Mentorship	—	—	36	93	4	78
Work-Based Learning Experiences	—	—	2	1	0	0
External Partnerships	—	—	11	541	0	0

Sources: UEPC Fall 2024 and Spring 2025 Grantee Questionnaires
Note: Blank cells in the table indicate "Not Applicable."

As Table shows, between Summer 2024 and Spring 2025, participating sites continued to leverage grant funds to provide a variety of grant activities to schools and students across Utah. This data also shows that the Makerspaces and Maker Learning as well as Out-of-Classroom (OOC) Experiences were the two largest reaching grant activity areas, with dozens of schools and thousands of students engaging in these grant-supported activities in both the fall and spring reporting periods. Furthermore, all grant activity areas but OOC Experiences reached fewer students in the spring than in the fall, suggesting a shift in focus across sites from other grant activities to OOC activities.

Grant sites successfully employed flexible program designs, curriculum integration, and community outreach to mitigate barriers and support student access to computing activities.
In focus groups, the UEPC team asked educators about how they engaged students in computing programs and activities, how they promoted student access, and current barriers to student access to CP programs and computing/computational thinking instruction. Additionally, in the end-of-year survey, educators across sites were asked how computing, engineering, and technology activities have become part of their schools', districts', or community's routines or educational culture. Lastly, we asked site leaders about implementation successes and barriers, and many provided responses related to student access.

The UEPC team identified a set of themes based on focus group and survey data analysis. This provides evidence that educators and their site leaders strategically designed programs to increase student access, built sustainability through school and community engagement and culture-building, and worked to alleviate cost, transportation, and scheduling barriers.

Increasing access through strategic program design

Programs expanded access by creating multiple entry points and flexible scheduling options that accommodated different student needs and interests. The data reveals that programs consciously designed multiple formats, some requiring long-term commitment, others allowing more casual exploration, to meet students where they are. This included separating programs by gender when appropriate, offering different difficulty levels, and providing both structured curriculum and open exploration time. Many programs created pathways for students to progress from introductory experiences to leadership or mentor roles.

- *I think [our district] has done a great job promoting and supporting their STEAM program. Multiple different things to get kids involved—STEAM Club (two, 8-week classes), Makerspaces (yearlong program, 30 hours total, drop-in activity), and STEAM Nights (school wide, family friendly, 2-hour activity with lots of materials). I think this has gotten so many students involved and several different levels. (Educator Survey)*
- *So one of the things that we've changed during this grant cycle is we've divided our summer stem camps and offer them for boys and girls separately... we've been able to reach twice as many kids because we're running the camp twice. And we've had girls in particular participate that would not have participated if it was a co-ed event. (Focus Group)*
- *I think part of what helped with that was… providing them with options. So, with our summer camp, they didn't have to come code with me... And just giving them the options… helped them to be more engaged with what they were doing. They weren't forced into something that they didn't want to learn, they were able to choose. (Focus Group).*
- *Our Makerspace is part of many teachers' routine yearly/semester-long plans. Additionally, many students make a habit of coming to our weekly opt-in Makerspace to pursue a wide variety of projects. (Educator Survey)*

Building Sustainability through Curricular Integration & Community Engagement

Educators explained that their programs built visibility and became more a part of the school culture by embedding STEM activities into regular

- *Our District calls it the 'STEMgineers Program' and we have a full curriculum of coding, robotics and stop motion film making. In my school I let the 6th graders race their prototypes in the hall, and my previous students come back*

school routines and engaging teachers and leaders across the school community. This involved integrating computing concepts into regular curriculum, creating ongoing expectations for STEM participation, and developing community partnerships that extended beyond school walls. The survey data shows some programs created systems where student products served authentic purposes—from school stores to community problem-solving—making the programs valuable beyond their educational goals.

to tell me that was what sparked their interest in pursuing further STEM classes. (Educator Survey)

- *It has become imbedded into our elementary curriculum and rotations for students, and at the secondary levels more classes are being offered in these fields. Additionally, in K-12, more teachers are becoming more aware and naturally embedding these skills, activities and materials into their already existing classes and curriculum. (Educator Survey)*
- *We have started a small school store and word has spread through the district. Now other schools are coming to us asking to make t-shirts and trophies. (Educator Survey)*

Mitigating Transportation, Cost, and Scheduling Barriers

Many educators shared that their programs actively identified and addressed logistical barriers that prevented student participation, with particular attention to transportation, cost, and scheduling conflicts. Examples of solutions included free programming, transportation assistance, hosting activities at multiple locations, and strategic timing to maximize accessibility.

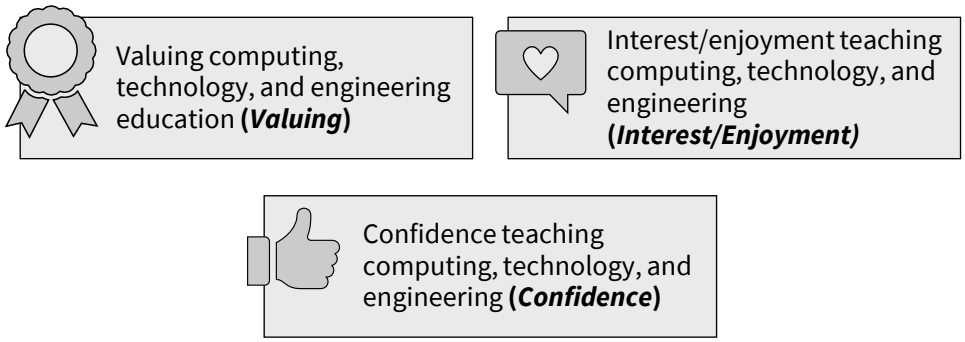
Some programs addressed barriers for specific populations through partnerships with transportation departments, offering programs at multiple school sites, providing meals during extended programs, and strategically timing offerings to work with family schedules.

- *A key success of the summer camp was providing transportation assistance for low-income and underserved communities, ensuring students could participate regardless of access barriers. By offering reliable pick-up and drop-off services through the [site] transportation department, the program increased accessibility and inclusion. (Fall 2024 Grantee Questionnaire)*
- *We're a Title I school and we have had some kids that have wanted to join in the summer, but with working parents, they have no way to get there. There's just different things like that. So we try and do it where we do the same camp, but we do it at three different schools in our cone site so that there's three different dates available and we try and do it in three different locations to kind of encompass as many people as possible. (Focus Group)*
- *We offer many choices for students to join on a variety of days plus not having a fee have helped increase our access. We are finding ourselves over filled with a waitlist, unfortunately have limited resources to implement more times. (Fall 2024 Grantee Questionnaire)*

Educator Outcomes and Their Growth in Computing Education Dispositions with Program Participation

The UEPC evaluation team examined a set of three outcomes for educators who facilitated STEM AC CP grant-supported programming during the 2024-25 academic year and who participated in the Educator EOY Survey and/or a series of educator focus groups that offered opportunities to explore these outcomes to address the third evaluation question. These outcomes are listed in Figure 6 below.

Figure 6. Educator Outcomes



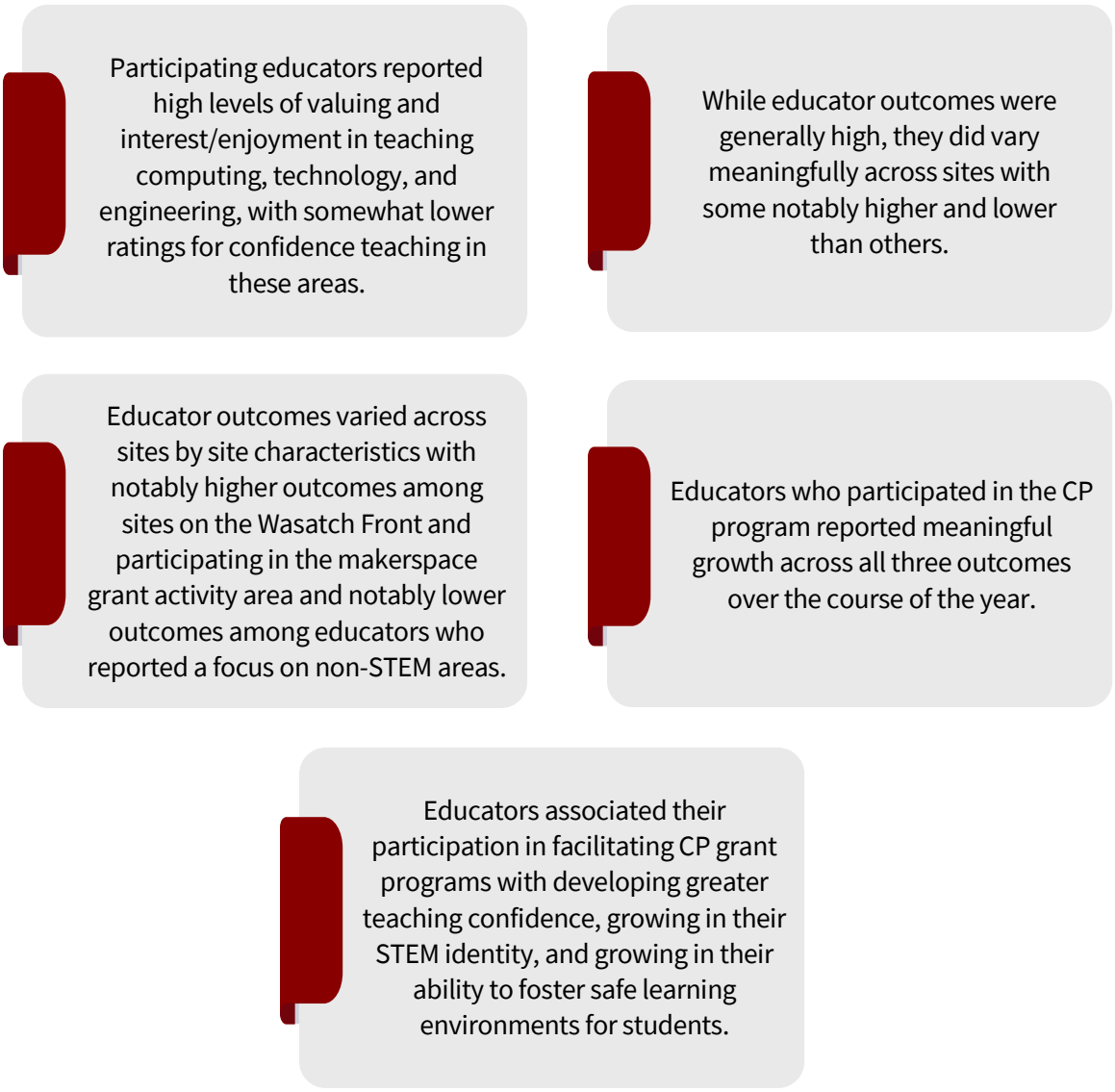
Source: Educator EOY Survey

The UEPC analysis of educator outcomes included educators from 14 sites.[3] Educators rated sets of survey items for both the beginning (retrospective) and end of the year (see Appendix E for scales, items, and reliabilities), reflecting the underlying outcomes on a 5-point Likert scale ranging from (1) strongly disagree to (5) strongly agree. The average of these groups of items is the composite score at each time point for each educator outcome (e.g., valuing, interest/enjoyment, and confidence).[4] In the context of the educator focus groups, the UEPC team also gained insights into educators' outcomes from a qualitative perspective to explain and extend what we learned from the survey analyses. Figure 7 below provides an overview of the main results for educator outcomes with additional supporting evidence in the following sections.

[3] Although there are 17 STEM AC CP grantee sites, 10 sites were represented in both the educator focus groups and surveys, 3 were represented only in the survey, 1 was represented only in the focus groups, and 3 sites had no educators participate in either the survey or the focus groups.

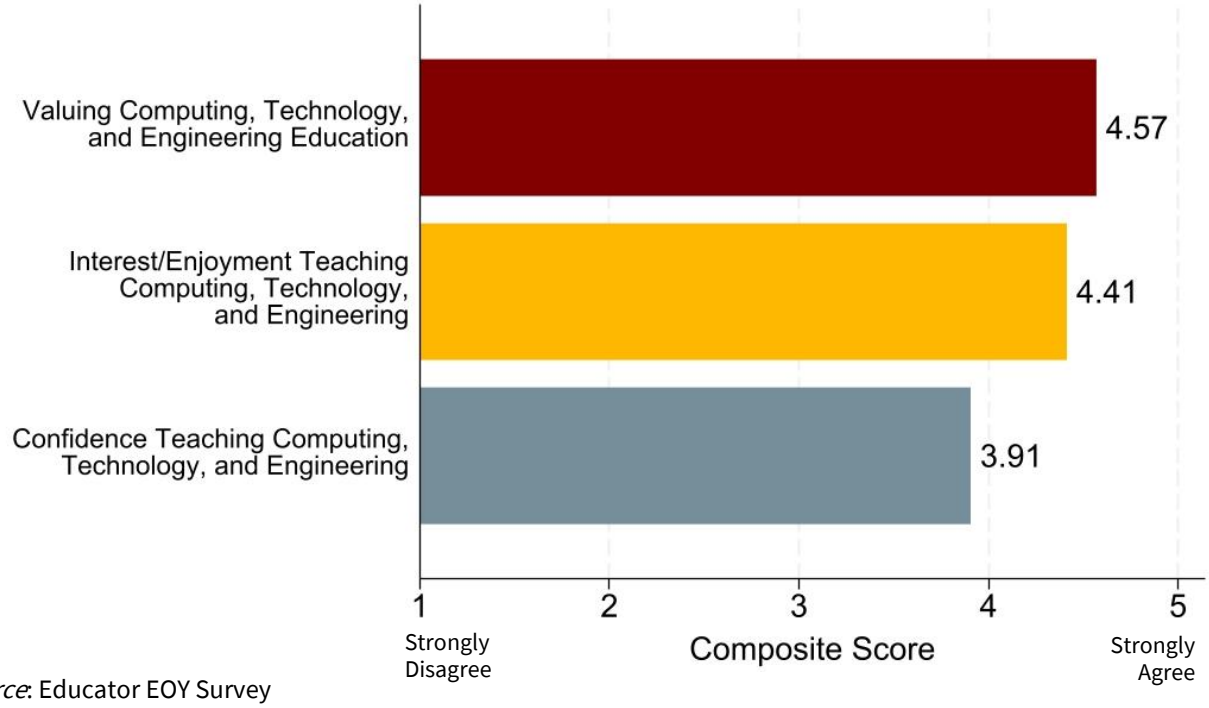
[4] The composite scores shown represent unmodified averages of educators' final ratings. We conducted sensitivity analyses using regression-adjusted means that controlled for initial composite scores and unmeasured site characteristics. Since differences between adjusted and unadjusted estimates were minimal, we present the unadjusted means for simplicity.

Figure 7. Overview of Results for Participating Educators' Outcomes



Educators reported high levels of valuing and interest/enjoyment in teaching computing, technology, and engineering, with somewhat lower ratings for confidence teaching in these areas. Educators across the 14 sites that participated in the survey reported generally high ratings for the three outcomes, with some notable variation, as shown in Figure 8. On average, educators agreed or strongly agreed with statements related to their valuing (4.57) of and confidence teaching (4.41) computing, technology, and engineering. There were, however, no statistically significant or meaningful differences between the means on these two outcomes. While educators did not disagree with statements about their teaching confidence (3.86), their ratings of this outcome were half a Likert scale point or lower than their ratings of valuing or interest/enjoyment (-0.66 and -0.49, respectively). Both of these differences were statistically significant ($p <$ .001) and meaningful.

Figure 8. Educator Self-Ratings of Outcomes



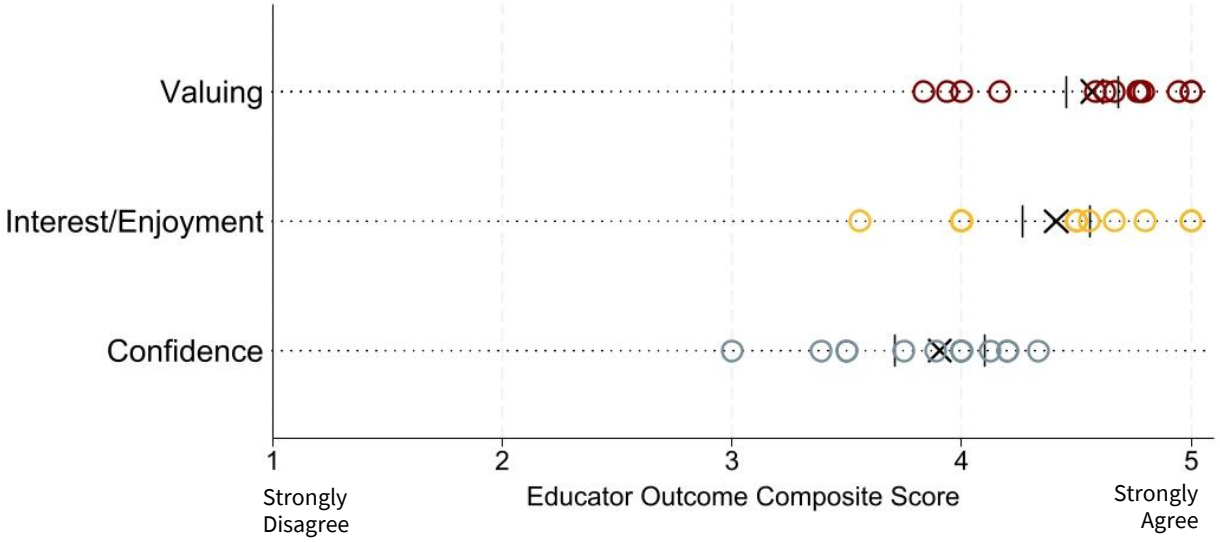
Source: Educator EOY Survey

Note. All pairwise differences between outcomes were statistically significant ($p <$ .001) and meaningfully different except for the difference between Valuing and Interest/Enjoyment. $N = 52$ for valuing and confidence; $N = 53$ for interest/enjoyment.

While educator outcomes were generally high, they did vary meaningfully across sites with some notably higher and lower than others.

Although educators' ratings across outcomes were generally high, the UEPC team found that the pooled averages alone obscured notable variation in educator outcomes across STEM AC CP grantee sites. Indeed, as visualized in Figure 9, when we plot the average composite score of each outcome for each individual site (shown as an open circle), the distribution of site averages around the pooled averages (as indicated by the black X marks) becomes more apparent. The pairs of parallel lines indicate 0.2 SD units above or below the pooled means, meaning that sites outside of either side of those lines are meaningfully different from those within the lines. Although there was variability, there were four sites that fell meaningfully below the mean for more than one outcome. Although the averages for these sites generally represented agreement on the outcome scales, for purposes of program improvement, we draw attention to those sites that fell meaningfully below the mean for these outcomes, as they present potential opportunities to explore reasons why their ratings were lower and to offer more support as needed to improve experiences for educators at these sites.[5]

Figure 9. Variation in Educator Outcomes by Site



Source: Educator EOY Survey

Note. Each hollow circle represents a different STEM AC CP site with educator outcome data (N = 13), and each black X represents the pooled mean across sites for a given outcome measure. All sites outside of the pair of vertical lines are meaningfully different from the overall mean (±0.2 SD units). Observations per site range from 1 to 10 (average of 4.6).

[5] These sites are not identified here but are noted separately to the STEM AC CP grant manager for internal purposes.

Educator outcomes varied across sites by site characteristics with notably higher outcomes among sites on the Wasatch Front and participating in the makerspace grant activity area and notably lower outcomes among educators who reported a focus on non-STEM areas.
In examining educator outcomes, the UEPC team also assessed variation in outcomes by STEM AC CP grantee site characteristics, including their location on or off the Wasatch Front, site grant activity areas, and the content focus area reported by participants. This variation is displayed in the three panels in Figure 10, which display the effect size (in SD units) for each site characteristic relative to sites without that characteristic. For each characteristic, bars that extend past the dashed red vertical lines on either side of the center line indicate a group that was meaningfully different from the reference group for a given outcome, making it readily visible which characteristics and outcomes were associated with the greatest differences in units that are comparable across outcomes.

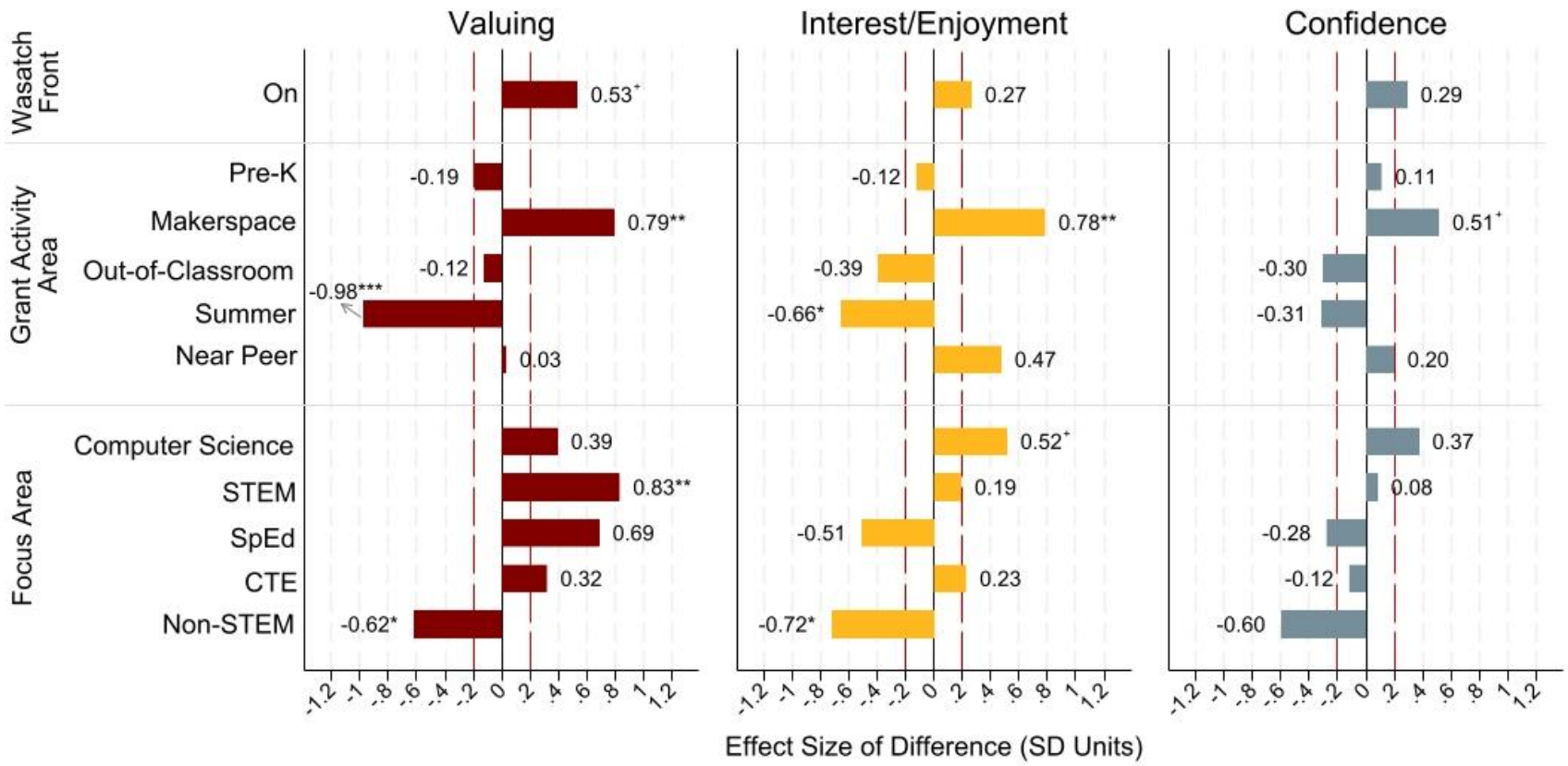
Wasatch Front. Educators at sites located on the Wasatch Front consistently had higher ratings across all three educator outcomes as compared to sites off the Wasatch Front. Educators at sites on the Wasatch Front expressed especially higher ratings of valuing computing, technology, and engineering education that were more than half a standard deviation unit above than those off the Wasatch Front, a difference that was both statistically significant (p<.05) and meaningful. While educators on the Wasatch Front also had meaningfully higher ratings for interest/enjoyment and confidence in teaching computing, technology and engineering, these differences were approximately half the size of the difference for the valuing outcome and were not statistically significant.

STEM AC CP Grant Activity Area. STEM AC CP site leaders indicated whether they used grant funds to support one or more of seven different grant activity areas, which included: pre-K enrichment, makerspaces and maker learning, out-of-classroom experiences, summer camps and activities, near-peer mentorship, and/or work-based learning (WBL) experiences. For these findings, it is important to note that educator survey data do not identify which grant activity area(s) they participated in, so we are identifying the difference in educator outcomes for sites with a given grant activity area relative to those without that area. Due to a lack of responses from educators at sites in the WBL grant activity area, we cannot include outcomes for that grant activity area.

As seen in Figure 10, the largest and most consistent difference across all three educator outcomes was for educators at sites implementing makerspaces and maker learning activities relative to those at sites that were not engaging in this type of grant activity. Specifically, educators at sites with makerspaces and maker learning had outcomes that were both meaningfully and statistically significantly higher than those at sites without them, ranging from 0.5 to nearly 0.8 standard deviation units higher. This difference, expressed as an effect size, is quite large and is three to four times higher than the typical differences observed in these analyses.

Also notable is that educators at sites with summer learning programs included in their grant activities had notably lower ratings as compared to educators at sites without summer learning programs, particularly for the valuing and interest/enjoyment outcomes (-0.98 and -0.66 SD units, respectively). This finding is curious since, at the time of the EOY survey, these sites had not yet implemented their summer learning programs, so there are some other meaningful systematic differences between sites with and without summer learning as a part of their grant activities that may explain this finding.

Figure 10. Variation in Educator Outcomes by Site Characteristics



Source: Educator EOY Survey

***$p < .001$, **$p < .01$, *$p < .05$, +$p < .10$

Note. Each bar is the difference between sites with and without a given characteristic expressed in standard deviation units. Bars that exceed the vertical dashed lines on either side of 0 (i.e., no difference between with and without) are meaningfully different from the comparison group for a given outcome. $N = 52$ for valuing and confidence; $N = 53$ for interest/enjoyment.

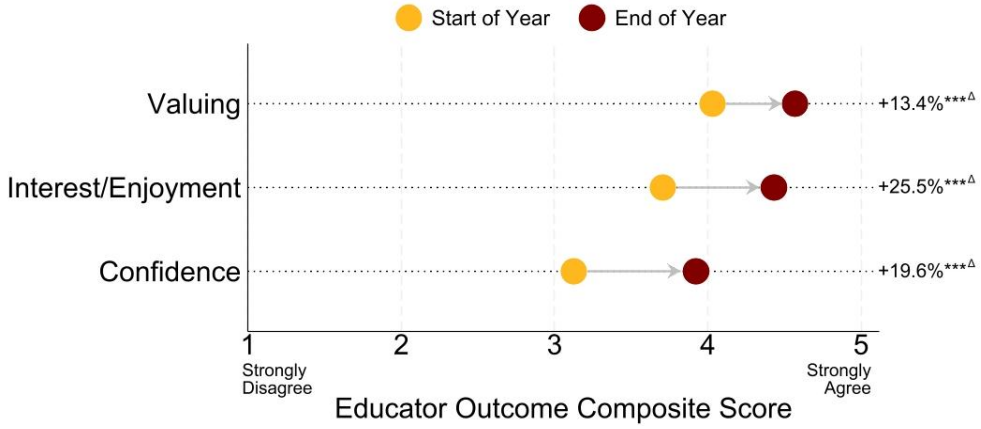
Guide for interpretation: For the Valuing outcome, educators on the Wasatch Front had composite scores 0.53 SD units higher than those off the Wasatch Front, a difference that was both statistically significant ($p<.05$) and meaningful (≥ 0.2 SD).

Focus Area. Educators also indicated whether they supported grant activities across a set of focus areas, including computer science, STEM, special education (SpEd), career and technical education (CTE), and/or non-STEM areas (e.g., English language arts). The UEPC examined variation in outcomes across these five focus areas with a few notable findings. First, educators who indicated their focus area was computer science had ratings on all three outcomes that were moderately and meaningfully higher than those of educators not focusing on computer science. Furthermore, educators who indicated STEM as a focus area expressed much higher ratings for the valuing outcome (0.83 SD units, $p < .01$) as compared to those who did not focus on STEM. However, differences for this same group on the interest/enjoyment and confidence outcomes were not meaningful or statistically significant. Educators who focused on non-STEM areas exhibited the most consistent pattern across outcomes, with ratings of 0.60 to 0.70 SD units lower than those who did not indicate a non-STEM focus. And finally, we note a different kind of pattern for educators participating in SpEd-focused areas relative to those who did not, with meaningfully and significantly higher ratings for the valuing outcome, but conversely, meaningfully lower ratings relative to those who did not focus on SpEd for both interest/enjoyment and confidence.

Educators who participated in the CP program reported meaningful growth across all three outcomes over the course of the year.

The UEPC evaluation team also analyzed how educators' self-ratings on the three outcomes differed between the two time points (i.e., the retrospective measure representing their rating for the beginning of the year and their current rating representing the end of the year). As seen in Figure 11, educators reported growth across the outcomes that was both meaningful (≥ 0.2 SD) and statistically significant ($p < .001$). We express these differences as a percent change (relative to the start of the year measure as baseline) for ease of interpretation and to allow for comparisons between changes in educator and student outcomes, which are measured using different Likert scales (5-point and 4-point, respectively). The largest change was in educators' interest/enjoyment, which grew by 25.5% (+0.80 points). Though ratings for confidence were initially the lowest, they grew by 19.6% (+0.73 points). Finally, educator growth during the year was smallest in magnitude for valuing but still grew by 13.4% (+0.54). Given the high educator ratings for valuing, this change may have been limited due to some ceiling effects. See the density plots in Appendix G to learn more about the underlying distribution shifts for each outcome between the two time points.

Figure 11. Changes in Educator Outcomes between the Start and End of the Year (2024-25 AY)



Source: Educator EOY Survey

***$p < .001$, **$p < .01$, *$p < .05$, $^{+}p < .10$, Δ meaningful difference (≥ 0.2 SD) regardless of statistical significance

Note: $N = 52$ for valuing and confidence; $N = 53$ for interest/enjoyment.

Educators associated their participation in facilitating CP grant programs with developing greater teaching confidence, growing in their STEM identity, and cultivating their ability to foster safe learning environments for students.

Educators also had opportunities to share additional information in open-ended responses included in the Educator EOY Survey and in focus groups to support a more nuanced understanding of their experiences with the educator outcomes of interest in the evaluation. Specifically, they were asked to:

- Share personal successes they experienced while supporting students in grant-related activities,
- Identify needs for resources and suggestions for improvement related to promoting educators' abilities or capacity to meaningfully engage students, and
- Reflect and share about their own growth and outcomes as a result in their participation in computing partnership grant activities.

The UEPC evaluation team identified the themes below based on qualitative analysis of focus group and survey data, revealing meaningful improvements in educators' confidence and comfort with technology and computing-related instruction, growth in educators' sense of students' potential and capabilities related to computing skills and problem solving, and increases in cross-curricular integration of STEM activities and growth in STEM identity among participating educators. The themes identified included developing confidence with technology and STEM instruction, embracing a culture of productive failure to create opportunities for students, and cross-curricular integration and increased STEM identity. The following sections offer more detail and illustrative quotes for each theme.

Developing Confidence with Technology and STEM Instruction

Educators across multiple sites described significant shifts in their relationship with technology, moving from hesitation and uncertainty to confidence and competence. This shift was particularly apparent among educators who discovered that they could learn new technologies and tools alongside their students. Survey data reinforced focus group responses, providing examples of educators who came to understand that they didn't need to know everything about computing resources and materials and that they could learn from their students. Many educators, however, did suggest a need for ongoing professional learning and training.

- *I was completely overwhelmed and scared to teach all of this! I felt very unqualified. But, I quickly discovered that kids are not scared to learn about new things. They dive right in and aren't afraid to make mistakes along the way. I realized that I didn't need to know everything about how the tool/toy/technology worked. The kids would actually teach me how to use it. (Educator Survey)*
- *You really do learn as you go. And you learn right along with the kids, and they will often be the teachers. Which I think is a very cool thing for them to experience. (Educator Survey)*
- *So I am 62 years old, so I feel kind of old in this space. I remember in high school when they said, someday we'll all have computers. And I said, not me. I actually cried. I'm like, I am never touching a computer... So this actually has made me really, I've grown a lot in my computer skills. (Focus Group)*
- *I have recently discovered that there is a lot more that I DON'T KNOW. There is a whole world full of possibilities and I only know a fraction of things. I need to have a PD where I can see and experience more things to learn and teach. (Educator Survey)*

Embracing a Culture of Productive Failure to Create Opportunities for Students

In surveys and focus groups, educators described learning to recognize student capabilities and gain appreciation for what students could accomplish when provided opportunities. Often, this recognition was associated with a willingness to "let students fail" and learn from those failures. Through this process, educators explained that they saw students' abilities that they were not previously aware of, and identified students' strengths, particularly related to hands-on activities and problem-solving.

- *I have always believed that my students could eventually grow into their potential and go do amazing things one day. I am slowly learning that I need to have more hope in their potential to do amazing things right now … I watched them do things this year that make me believe that I might be the thing holding them back. (Educator Survey)*
- *I really think just the opportunity for them to try and error and … putting it back on them to figure out how to make it work and just allowing them that exploration... we are seeing more girls… students with maybe some disabilities find strengths for themselves that they can't always excel in other places, but they really are able to excel here. (Focus Group)*
- *I think a big thing for me is letting go of control and allowing students to be in charge of their own learning... And that's not my choice to make for them. I want them to have every opportunity to make a choice of 'Do I like this, do I not?' And by allowing them to have fun while learning the proper steps, I think is more effective than trying to be the most effective robotics teacher I can be. (Focus Group)*

Cross-curricular Integration and Increased STEM Identity

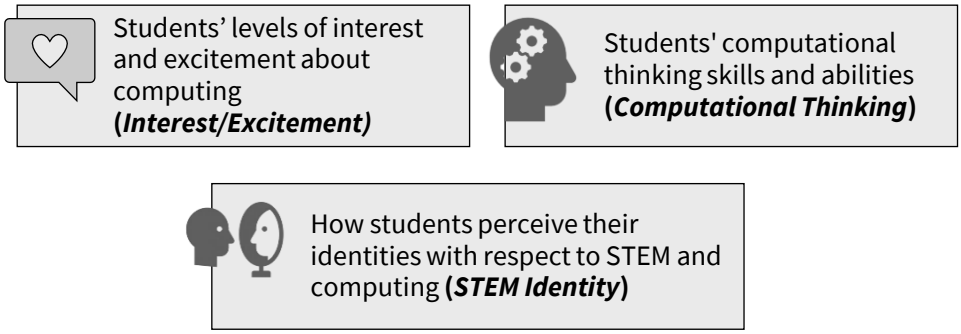
Many educators indicated that through CP programming, they developed new abilities to integrate STEM across traditional subject areas while also expanding their own professional identities to incorporate STEM competencies. The survey data show educators gaining confidence in technology skills and seeing themselves as STEM educators regardless of their original training. Educators also expressed greater understanding of the importance of moving from "STEM as a special event" to "STEM as a way of thinking across the curriculum."

- *I gained a deeper understanding of STEM/CS concepts. My confidence as a teacher grew, and I found a greater purpose in teaching. I am able to see the value in STEM in all academic areas, and highly value teaching STEM as part of everyday curriculum. (Educator Survey)*
- *To truly deepen student engagement in computing, engineering, and technology, we need to invest in building teacher agility, training, and a mindset of content integration... Most importantly, we need to shift the mindset from 'STEM as a special event' to 'STEM as a way of thinking across the curriculum. (Educator Survey)*
- *There's so much just regular, somewhat mundane things that we have to teach that can get boring after a while doing the same thing. And this is a new way, and it's constantly challenging me to think of new ways to introduce it and add that fun element that more higher learning element in. (Focus Group)*

Student Outcomes

The UEPC evaluation team also assessed three outcome measures for students who participated in STEM AC CP grant-supported programs during the 2024-25 AY. Both students and educators who participated in their respective end-of-year surveys responded to items regarding the student outcome measures, while open-ended survey responses and educator focus groups allowed us to examine student outcomes associated with program participation in greater depth. These outcomes are listed in Figure 12.

Figure 12. Student Outcome Measures

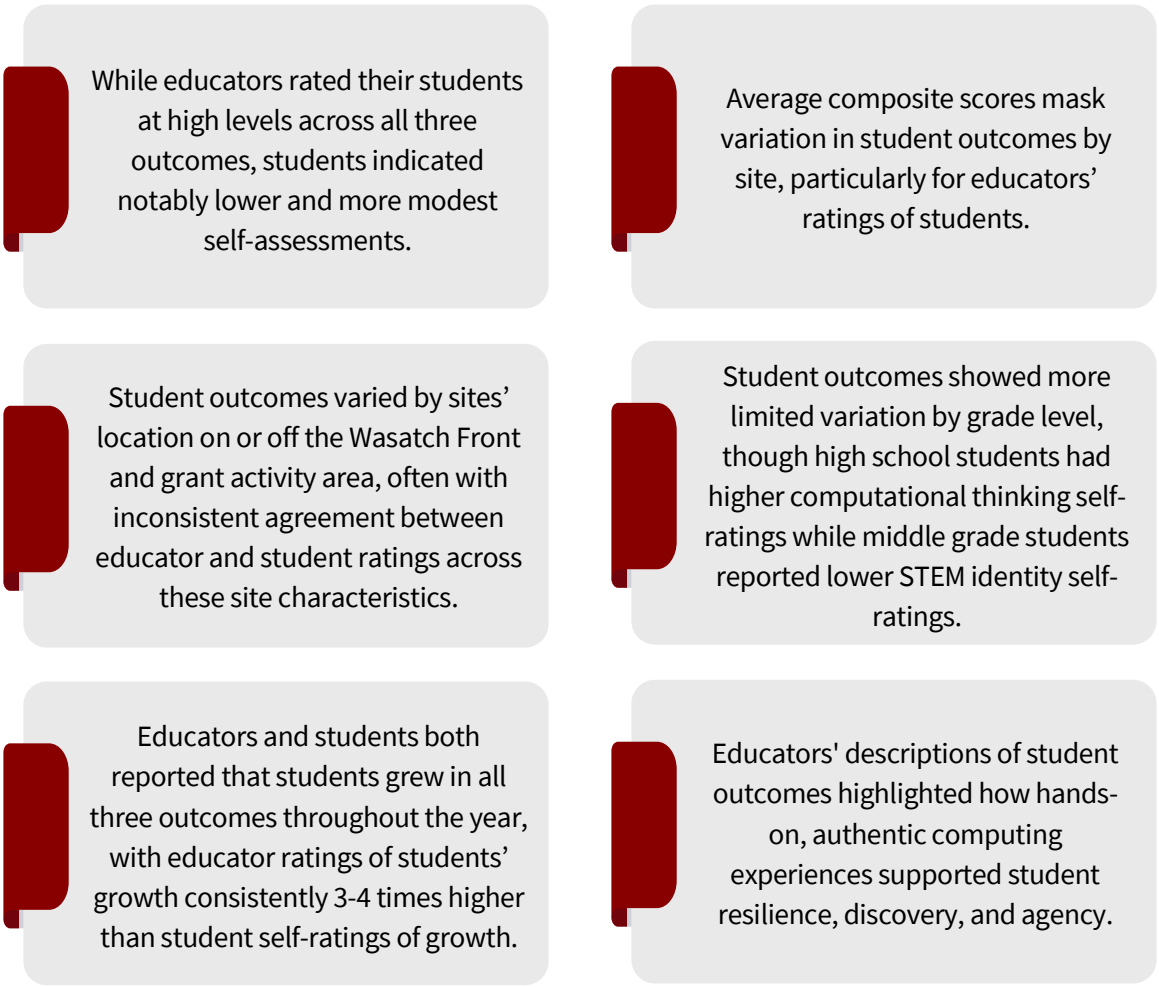


Sources: Student and Educator EOY Surveys

The UEPC analysis of student outcomes included 49 educators from across 12 sites (average of 4.1 educator responses per site) and 1,860 students from across 10 sites (average of 186 student responses per site). It bears repeating from the prior discussion of data collection that a significant limitation to these analyses is that 94% of all student responses came from just three sites, with the remaining distributed across the other seven sites (see the chart in Appendix F for more detail). This skewed distribution of student responses across sites creates a substantial issue of representation of sites in these findings, so we suggest readers take caution not to generalize or overinterpret findings that emerge from the student self-assessments as a consequence of this limitation in the data.

Both educators and students rated sets of statements on a 4-point Likert scale based on the extent to which they were (1) not at all like them/me to (4) a lot like them/me. Composite scores for student outcomes (e.g., interest/excitement, computational thinking, and STEM identity) were calculated by averaging related items at each assessment period (see Appendix E for scales, items, and scale reliabilities) for both educators' ratings of students and students' self-ratings. Through educator focus groups, the UEPC team also gathered qualitative data that helped interpret and elaborate on the quantitative survey results. Figure 13 provides an overview of the main results for student outcomes, with additional evidence discussed in the following sections.

Figure 13. Overview of Results for Participating Students' Outcomes

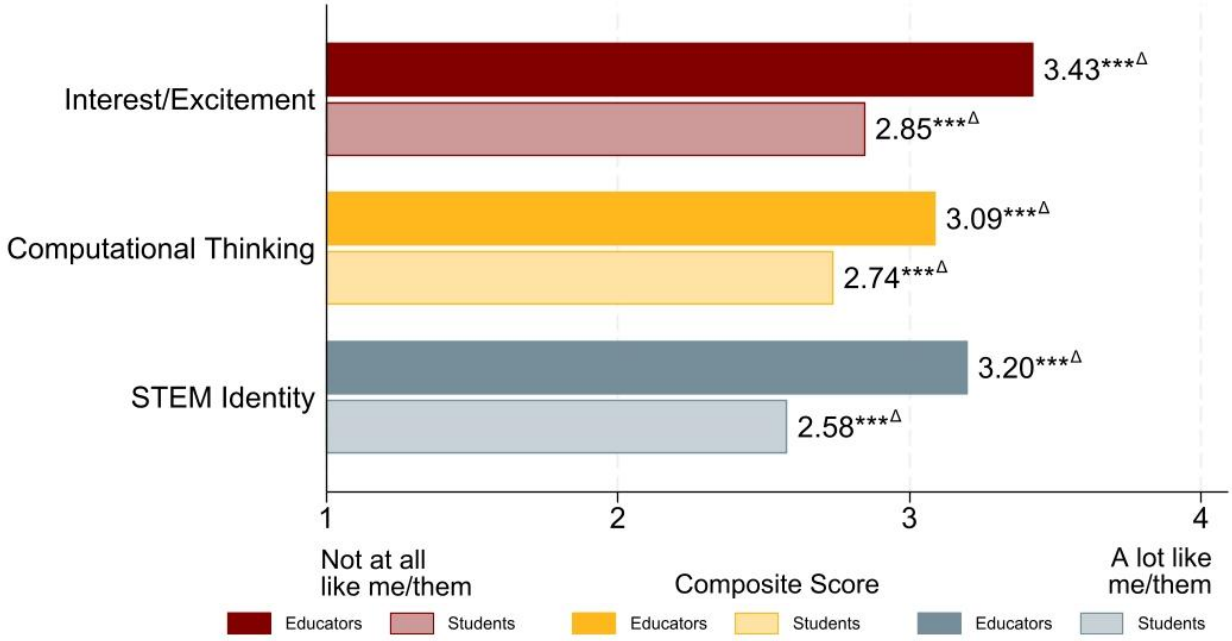


While educators rated their students at high levels across all three outcomes, students indicated notably lower and more modest self-assessments.

Educators' end-of-year ratings of students were generally high across outcomes, with composite scores reflecting agreement that statements were mostly to a lot like their students. There were, however, pronounced differences between educators' ratings of students and students' self-ratings as seen in Figure 14. Students' self-ratings were more modest compared to educators' ratings of student outcomes, with composite scores reflecting reactions to statements for each outcome that ranged from a little bit to mostly like them, though the magnitude of these differences between the two respondent groups varied. The largest gaps were between the ratings for students' interest/excitement and STEM identity (0.58 and 0.62, respectively), each difference reflecting about three-quarters of a standard deviation unit. The smallest difference in educator and student ratings was for computational thinking skills (0.35), though the difference is still equivalent to nearly half of a standard deviation unit, so still a meaningful and large difference.

For both educators' and students' ratings, all pairwise differences between outcomes, both within and between respondent groups, were statistically significant ($p < .001$) and meaningfully different. Educators and students demonstrated agreement in offering the highest ratings for students' interest and excitement about computing (3.43 and 2.85, respectively). There was some discrepancy in the relative ranking of educators' and students' ratings of the outcomes for computational thinking and STEM identity, with educators' rating students' levels of STEM identity higher than their computational thinking, and the reverse order for students (computational thinking higher than their STEM identity). As mentioned earlier, we caution against overinterpretation due to limited site representation in the student responses, but given parallels with similar discrepancies between educator and student responses in last year's evaluation, suggest that these differences may warrant further investigation.

Figure 14. Student Outcomes as Rated by both Educators and Students



Sources: Educator EOY Survey, Student EOY Survey

***$p < .001$, **$p < .01$, *$p < .05$, $^{+}p < .10$, $^{\Delta}$ meaningful difference (≥ 0.2 SD) regardless of statistical significance

Note. All pairwise differences between outcomes within respondent groups were statistically significant ($p < .001$) and meaningful. All pairwise differences within a given outcome between respondent groups were also statistically significant and meaningful ($p < .001$). For educators $N = 48$-49; for students $N = 1{,}852$-1,860.

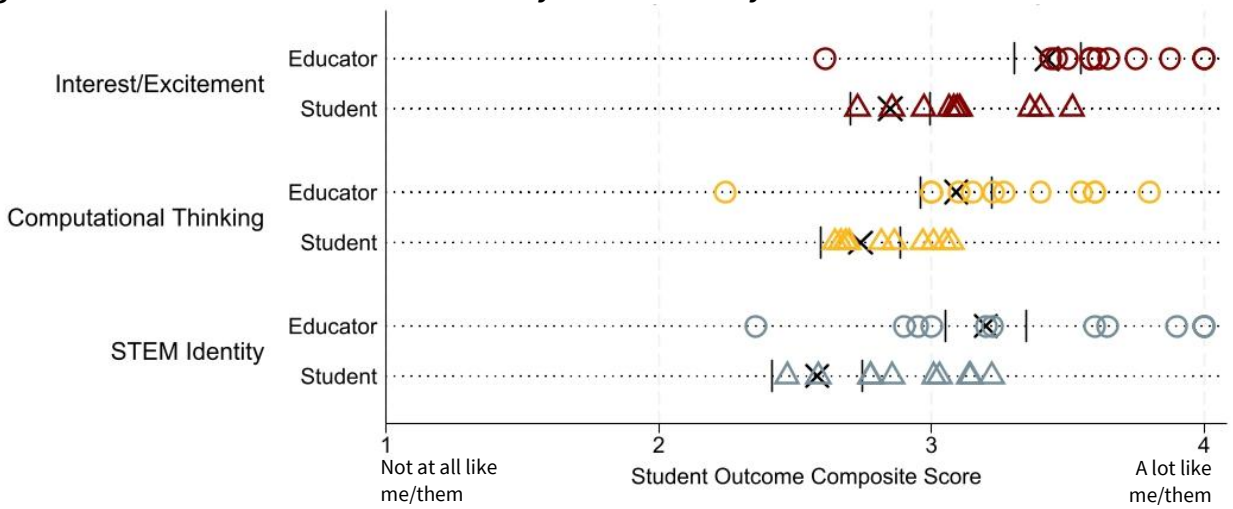
Average composite scores mask variation in student outcomes by site, particularly for educators' ratings of students.

Similar to the average composite scores for educator outcomes, the UEPC evaluation team found that only reporting the pooled means for student outcomes masked considerable variation in site-level means, as seen in Figure 15. In the figure each open circle represents a mean for educator ratings of student outcomes at a given site while the corresponding line below includes open triangles for the mean of student-self ratings, the black X marks represent the pooled mean across sites for each respondent group, and the pair of vertical lines indicate scores that are ±0.2 SD units outside the mean—allowing for quick identification of sites that are meaningfully above or below the mean.

For educators' ratings of student outcomes, we see there was one site in particular that was meaningfully below the mean for all three outcomes. Interestingly, this site is much closer to the mean for *students' ratings* of outcomes so it may represent an interesting outlier in that respect. Unfortunately, we do not have corresponding student survey data for that particular site to make a direct comparison within the site. There were an additional three sites with means for STEM identity that were meaningfully below the pooled average, yet still well above the corresponding pooled average for students' self-ratings. While there is site-level variation in the composite score averages, even at the individual site level, educators' ratings of students are persistently higher than those of students.

A different pattern emerges when we turn to the site means for students' self-ratings. Unlike educators' self-ratings for their own outcomes or those of students, there are no sites with student self-ratings that fall meaningfully below the mean. However, there is a cluster of sites that are meaningfully above the mean and closer to the pooled means for educators' ratings of students. The overall rankings of means by sites across respondent groups are not aligned with one another; in other words, the sites with the highest/ lowest ratings of student outcomes by educators are not the highest/lowest for students' self-ratings.

Figure 15. Variation in Educator Outcomes by Site as Rated by Educators and Students



Sources: Educator EOY Survey, Student EOY Survey

Note. Each hollow circle/triangle represents a different STEM AC CP site (N = 12 for educators and N = 10 for students), and each black X represents the pooled mean across sites for a given outcome measure and respondent group. All sites outside of the pair of vertical lines are meaningfully different from the overall mean (±0.2 SD units). Observations per site range from 1 to 10 (average 4.1) for educators and range from 0 to 876 (average 186.0) for students.

Student outcomes varied by sites' location on or off the Wasatch Front and grant activity area, often with inconsistent agreement between educator and student ratings across these site characteristics.

The UEPC team also explored variation in student outcomes by STEM AC CP grantee site characteristics, including sites' location on or off the Wasatch Front and grant activity area. This variation is shown across the three panels in Figure 16, one for each student outcome. The graphs present the effect sizes (SD units) for each site characteristic relative to those without that characteristic. The figures include separate bars showing both educator ratings of students and student self-ratings. Bars extending beyond

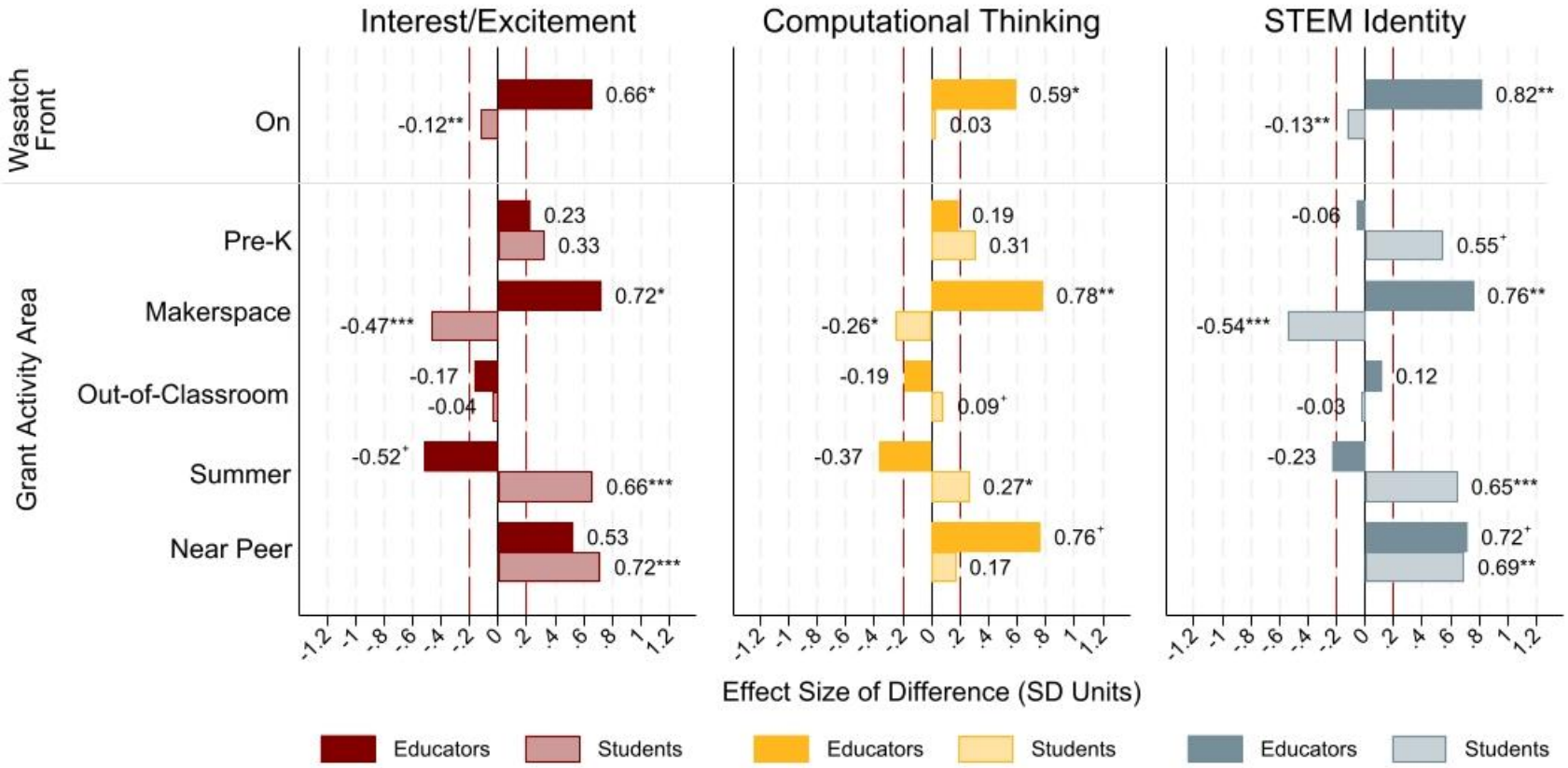
the dashed red vertical lines indicate meaningfully different groups compared to the reference group, making it readily apparent which characteristics were associated with the largest differences across comparable outcome units. Although some patterns emerge, the picture is complicated by sometimes large discrepancies in both the magnitude and direction of differences for educators' ratings of students and students' self-ratings.

Wasatch Front. Educators at sites on the Wasatch Front consistently rated students higher across all three outcomes as compared to educators at sites off the Wasatch Front. This difference was largest for students' STEM identity (+0.82 SD units, $p < .01$), though still both meaningfully and statistically significant for both interest/excitement and computational thinking (+0.66 and +0.59 SD units, respectively, both $p < .05$). Despite the magnitude of this difference for educators' ratings of students, students on the Wasatch Front rated themselves *lower* for interest/excitement (-0.12 SD units) and STEM identity (-0.13 SD units) as compared to their peers at sites off the Wasatch front. There was no difference between students on and off the Wasatch front for computational thinking skills. Although these differences were statistically significant ($p < .05$), neither was meaningfully different, and both were just a fraction of the size of the difference expressed by educators for students.

Grant Activity Area. STEM AC CP grant activities fell into one of seven areas: pre-K enrichment, makerspaces and maker learning, out-of-classroom experiences, summer camps and activities, near-peer mentorship, and/or work-based learning (WBL) experiences. As discussed in the findings for educator outcomes, these grant activity areas were not mutually exclusive (e.g., a site could be engaged in any combination of them) and we can only assign them to sites, not individual student or educator survey responses. We continue to lack sufficient responses from educators or students at sites with WBL experiences and therefore, cannot include them in these analyses.

Educators and students at sites with near-peer mentorship activities demonstrated agreement in responses, with meaningfully higher ratings across all three outcomes as compared to respondents at sites without near-peer mentorship activities (one exception, the difference students' ratings for computational thinking were just shy of being meaningful). Meanwhile, educators at sites with makerspaces or maker learning expressed statistically significant and meaningfully higher ratings than educators at sites without makerspaces or maker learning, ranging from 0.72 to 0.78 SD units higher. Conversely, students at sites with maker spaces or maker learning consistently expressed statistically significant and meaningfully lower ratings across all three outcomes, though the magnitude of these differences was somewhat smaller.

Figure 16. Variation in Student Outcomes by Site Characteristics as Reported by Educators and Students



Sources: Educator EOY Survey, Student EOY Survey

****p* < .001, ***p* < .01, **p* < .05, +*p* < .10

Note. Each bar is the difference between sites with and without a given characteristic expressed in standard deviation units. Bars that exceed the vertical dashed lines on either side of 0 (i.e., no difference between with and without) are meaningfully different from the comparison group for a given outcome. For educators *N = 48-49*, for students *N* = 1,852-1,860.

Guide for interpretation: For the Interest/Excitement outcome, educators on the Wasatch Front had composite scores 0.66 SD units *higher* than those off the Wasatch Front, a difference that was both statistically significant (p<.05) and meaningful (≥ 0.2 SD); conversely, students on the Wasatch Front reported composite scores that were 0.12 SD units *lower* than those off the Wasatch Front, a difference that was statistically significant (*p* < .05) but not meaningfully different.

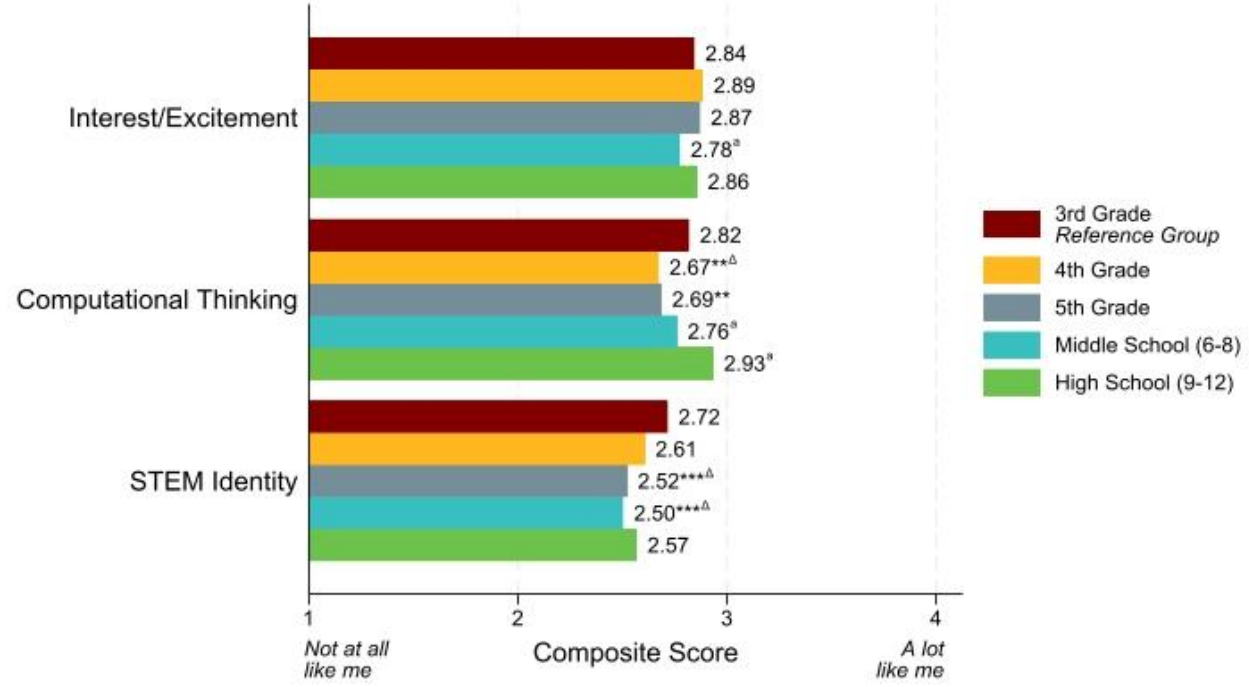
Student outcomes showed more limited variation by grade level, though high school students had higher computational thinking self-ratings while middle grade students reported lower STEM identity self-ratings.

The UEPC team also assessed differences in student outcomes by students' grade and/or grade span, as shown in Figure 17.[6] There was more limited variation in student outcomes by grade, though a few statistically significant and meaningful differences emerged. First, on average, middle school students offered lower ratings for interest and excitement than fourth or fifth grade students ($p < .05$). High school students expressed particularly high self-ratings for their computational thinking skills, higher than students in fourth and fifth grade ($p < .01$) or middle school grades ($p < .05$). Students in fourth and fifth grade expressed the lowest ratings for computational thinking, also significantly lower than those in third grade. Finally, third-grade students expressed the strongest sense of STEM identity and were significantly and meaningfully higher in this outcome than students in fifth grade or middle school ($p < .001$).

Recalling that these responses are biased towards a few sites with large fractions of the student survey responses, it is possible that these differences are being driven by site-specific programs. Alternatively, given the relatively small differences, these patterns may be downstream of developmental patterns (e.g., middle school students expressing less excitement, high school students having accumulated more computational thinking skills).

[6] Due to increasingly small cell sizes in grades higher than fifth we collapsed middle school and high school grades into groups.

Figure 17. Variation in Student Outcomes by Student Grade or Grade Span



Source: Student EOY Survey

***$p < .001$, **$p < .01$, *$p < .05$, $^{+}p < .10$, $^{\Delta}$ meaningful difference (≥ 0.2 SD) regardless of statistical significance

[a]Denotes a statistically significant and/or meaningful difference with another group other than the reference group.

Note: In addition to the differences between each grade or grade span above and the reference group (3rd grade), middle school students rated interest/excitement significantly lower than students in grades 4 and 5 ($p < .05$), high school students rated computational thinking significantly and meaningfully higher than students in grades 4 and 5 ($p < .01$) and as compared to students in middle school grades ($p < .05$) . Samples sizes by group: 3rd (N= 385-387), 4th (N= 451-452), 5th (N= 529-531), 6th-8th (N = 388-392), and 9th-12th (N= 97-98)

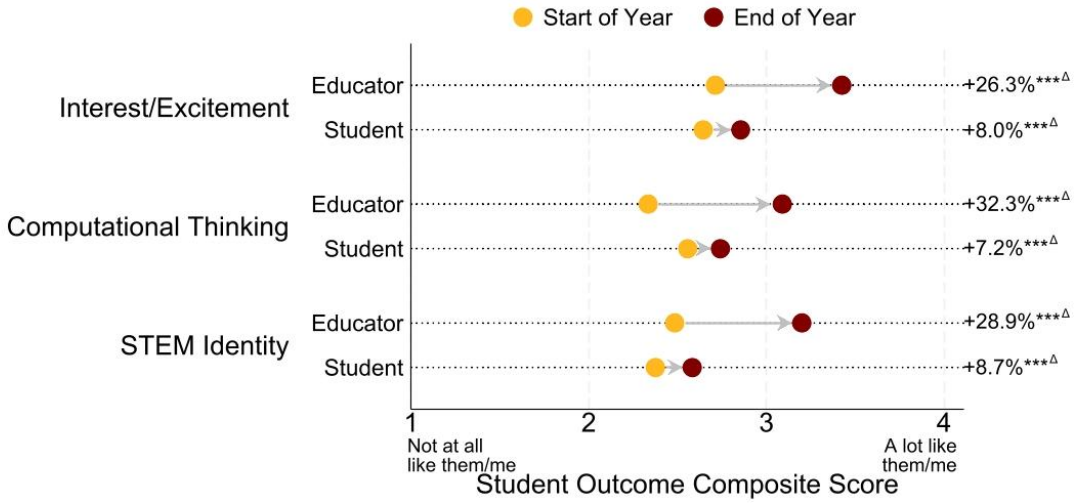
Educators and students both reported that students grew in all three outcomes throughout the year, with educator ratings of students' growth consistently 3-4 times higher than student self-ratings of growth.

As a final step in the quantitative analysis of student outcomes, the UEPC team assessed how both educators' ratings of students and students' self-ratings changed between the start and end of the year.[7] As displayed in the dot plots in Figure 18, both educators and students reported growth across all three student outcomes over time and all differences were both statistically significant ($p < .001$) and meaningful. It is quickly apparent, however, that educators were more optimistic about students' growth across outcomes than students were, with changes in ratings between the start and end of the year that were 3.4 to 4.1 times larger than the growth in outcomes expressed by students. This discrepancy is largely driven by the differences in ratings between educators and students at the end of the year, where educators expressed substantially higher ratings than students compared to differences in start-of-the-year (retrospective) ratings. On average, educators expressed moderately greater growth for student outcomes (26.3 to 32.2% increases) as compared to the growth they expressed for their own outcomes

[7] Similar to the educator outcomes, these were retrospective and current measures collected at a single time point to support a stable sample.

(13.4 to 25.5% increases). See Appendix H for a more detailed visualization of the changes in distributions of responses for educators and students across the 2024-25 AY.

Figure 18. Changes in Student Outcomes between the Start and End of the Year (2024-25 AY) as Reported by Educators and Students



Sources: Educator EOY Survey, Student EOY Survey

***$p < .001$, **$p < .01$, *$p < .05$, $^{+}p < .10$, $^{\Delta}$ meaningful difference (≥ 0.2 SD) regardless of statistical significance

Note: There are no significant differences in changes over the course of the year for outcomes within groups. For educators *N = 48-49*, for students *N* = 1,852-1,860.

Educators' descriptions of student outcomes highlighted how hands-on, authentic computing experiences supported student resilience, discovery, and agency.

Beyond quantitative measures of students' outcomes, the UEPC also leveraged qualitative data to gain more nuanced perspectives on the experiences and outcomes of students participating in STEM AC CP grant-supported programming. In focus groups and open-ended survey items, educators were asked to share their perceptions of student outcomes that resulted from the implementation of computing partnership programs. As the themes and illustrative quotes below show, these data suggest that students have engaged in hands-on and authentic learning experiences through which they have built resilience and "tolerance for failure," identified new strengths and opportunities for success, and been given agency to identify and solve problems in the classroom.

Building Resilience and a "Tolerance for Failure"

Educators consistently observed students developing greater comfort with failure, mistakes, and problem-solving through their participation in computing partnership programs. They described this resilience as increased willingness to take creative risks, persist through challenges, and view setbacks as learning opportunities.

Focus group and survey data reveals that students learned to approach complex problems with patience and curiosity, developing debugging skills that transferred beyond technical contexts. Educators noted that this shift in mindset toward failure was particularly powerful for students who might struggle in traditional academic areas, as STEM activities provided alternative pathways to experience success and build confidence.

- *An increase in a student's tolerance for failure as well as an increase in creativity and individuality in projects and creations. Also, an increase in ability to code and build. (Educator Survey)*
- *Students are working together to problem solve and being creative instead of instantly raising their hands and saying, 'I need help!' the first nanosecond something doesn't go quite as planned. (Educator Survey)*
- *Something that I do a lot in my own classroom is having a culture of failure… We help them with the debugging process of the computation of going and finding, 'Okay, what's the problem here? What am I trying to get this to do? Let's work backwards to see where the problem is coming from.' Kids tend to be a little bit more open to trying the hard new thing when they understand that it's okay to fail. (Focus Group)*
- *I feel like it really helped all of our students be more open to new things and to being frustrated and able to work through that frustration and fail in a safe way, so they understand that failure is not the end. Nothing bad happens when you fail, really. (Focus Group)*

Discovering Strengths and Opportunities to Succeed

Many educators provided examples of students discovering capabilities and strengths they didn't know they possessed, particularly those students who might struggle in traditional academic areas. Educators observed that STEM activities provided alternative pathways for students to experience success, build confidence, and develop positive academic identities, including in coding or computing activities and more hands-on problem solving coursework.

Educators shared that some students who "thought they could not code" gained confidence and grew to actively participate in problem-solving. The data reveals that some students began to identify as "problem solvers" and "STEM students," representing significant shifts in academic identity.

- *Students were better able to handle failure and mistakes, allowing them to be more creative and bold with the choices that they made when trying new things. They also improved significantly in their ability to program and build, as well as in finding ways to get coding to do what they wanted to do. (Educator Survey)*
- *Several of my students began the year thinking they could not code and did not have the skills or abilities to solve problems or debug. Throughout the class, they have gained confidence in their own skills and abilities and actively participate and offer comments and suggestions when we are solving problems as a group in class. (Educator Survey)*
- *I think when they get to do STEM, they see that they do have a strength that they maybe wouldn't have had otherwise. And so even though I teach first grade, I will give up my prep to go help teachers implement STEM things in their classrooms, make sure that every first grader… is feeling comfortable with STEM concepts. (Focus Group)*

Developing Agency through Problem-solving

Educators described students taking increasing ownership of their learning and developing leadership skills in makerspaces, out-of-classroom programs, and summer camps. Students moved from passive recipients of instruction to active creators and problem-solvers, often taking on teaching roles with peers and making decisions about their own learning pathways. The data shows students developing cross-curricular connections, technical skills, and the confidence to tackle increasingly complex challenges. Particularly noteworthy are examples of students creating practical solutions for teachers and school problems, demonstrating application of their learning.

- *Students were better able to handle failure and mistakes, allowing them to be more creative and bold with the choices that they made when trying new things. They also improved significantly in their ability to program and build, as well as in finding ways to get coding to do what they wanted to do. (Educator Survey)*
- *I was very impressed by the older students who have been through the robotics program the past two years ability to take on leadership roles throughout the year. They helped peers that needed assistance and divided up roles to make sure everyone had a part in the project. (Educator Survey)*
- *So at first it was a lot of, Hey, we'll show you how to do this. Now you go and do it. But now it's turned into a lot of mornings they come in, we basically are like, Hey, what's your plan? What are you doing? And then they run everything. (Focus Group)*

Exploring Associations between Educator and Student Outcomes

In the final research question, the UEPC team examined associations between educator and student outcomes to explore the possible connection between educators' development in facilitating grant-supported programs and changes in student outcomes related to their experiences in CP-supported programs. We leveraged both the quantitative survey data and qualitative data from educators' open-ended responses to survey items and the educator focus groups to address this question. We provide an overview of the main results in Figure 19, and more details supporting each main result are provided in the following sections.

Figure 19. Overview of Results for Associations Between Educator and Student Outcomes

While there were no associations between survey measures of educator and student outcomes, this does not preclude other potential connections between them.

Educators described how their experiences supporting grant activities led to reciprocal learning opportunities and influenced students' understanding of STEM as educators focused more on cross-curricular integration.

While there were no associations between survey measures of educator and student outcomes, this does not preclude other potential connections between them.

Like the 2023-2024 AY annual evaluation finding, the UEPC team found no statistically significant correlations between educators' and students' outcomes from the educator or student survey measures. This finding held when we tested the correlations between outcomes for the two respondent groups at both time points, the change between time points, or for either the educator or student rating of the student outcomes. This does not lead us to conclude that there is no association between educator and student outcomes; it is simply that we did not detect an association between them in these data.

There are a few plausible explanations for this. First, a correlation requires two measures within the same observation, which means we must collapse the data to the site-level. As we cannot observe which students are with which educators, meaning our total same size is reduced to just 10, so we may be underpowered to detect an association that does in fact exist. Second, it may be that the growth educators experience across outcomes in a given year has a lagged effect on student outcomes. In other words, educators may be accruing experience, confidence, and skills throughout the current year that will more substantially improve the experiences of their students in subsequent years. And finally, it may be that this association between educator and student outcomes is more nuanced than can be detected by quantitative survey constructs. This possibility led us to turn to our qualitative data to explore in the following section.

Educators experiences supporting grant activities led to reciprocal learning opportunities and influenced students' understanding of STEM as educators focused more on cross-curricular integration.

While asking educators how participating in the grant has impacted them and their students on the EOY Educator survey and during focus group sessions, the UEPC team also asked them to reflect on how they leveraged their experiences supporting grant activities to promote their students' growth and development. The themes and illustrative quotes below summarize key reflections from participating educators about how they learned alongside students in these contexts and how their ability to support cross-curricular integration helped students understand STEM as a way of thinking, not just specific content areas.

Reciprocal Learning: Educators as Learners

Educators provided examples of how embracing learning alongside their students enhanced outcomes for both groups. Educators consistently described how embracing some uncertainty and risk in their pedagogy could support a kind of reciprocal learning, in which students were granted agency to learn and problem-solve using new materials, then turn and teach others, including their own teachers. This process supported student confidence and educator technical competence as well as

- *I knew absolutely nothing about coding, about computer science... but I learned from the kids. I was amazed at how much the kids taught me. And even kids had never coded before, had never done anything like that before. They pick it up so fast. And I had this one kid that was just amazing at coding, and so he would create something and I would go home and I would copy it and try and copy it and figure out how he did it. (Focus Group)*
- *So I've definitely learned to let go of the control aspect of my life. The kids will come in and can we do this? I'm like, absolutely. But the rules that you can't ask me any questions because I don't know, as long as you're willing to figure it out, then I got your back, I'll support you. But then*

building pedagogical flexibility. Many educators noted particularly valuable benefits for students who struggled in traditional academic areas, as they found opportunities to demonstrate expertise that educators recognized and valued.

kids love that. They love being able to teach me. (Focus Group)

- *I learned a lot about giving the students the autonomy to solve the problems and explore. They love it! (Educator Survey)*
- *[Students] lean on each other and I'm really impressed with how other kids are like, oh, I know how to do that. And they jump up and run over and help. And so I think they do see themselves as skilled and able to teach others and that's pretty cool. (Focus Group)*

Cross-curricular Integration Supports Students to Understand STEM as a "Way of Thinking"

Some survey and focus group data pointed to benefits of cross-curricular integration for both students and educators. In these data, educators shared perceptions that their efforts to integrate STEM across subject areas contributed to students making connections between STEM and computer science concepts and more traditional areas such as literature and math. Educators expressed a sense that as they promoted this kind of integration, students demonstrated deeper understanding of STEM as a "way of thinking" rather than isolated content and concepts.

- *I have really loved seeing my students make cross-curricular connections all year long. For example, recently, the third graders combined programming, Spyro Indie bots to draw a polygon, and then measuring and calculating the perimeter of that polygon. Younger students are also having awesome experiences, such as programming a blue bot to navigate an alphabet map in order to spell sight words. (Educator Survey)*
- *Students were excited about STEM. They loved participating in STEM activities. We also saw growth in all academic areas due to STEM education. (Educator Survey)*
- *I can take something that's sometimes hard like writing and we can see if we can make those [mechanical] bees or the cars make a W, or we can try and make them make a letter, or we can count them and see how far they can go and measure the distance... And this is a new way, and it's constantly challenging me to think of new ways to introduce it and add that fun element—that more higher learning element. (Focus Group)*

Recommendations

The following recommendations aim to build on the STEM AC Computing Partnership Grant program's success and address growth opportunities identified by the 2024-25 evaluation. They are intended to highlight additional ways the STEM AC can leverage its role as an intermediary to support program improvement and promote impactful practices across participating sites to support the implementation and scaling of opportunities and experiences related to computing, computer science, or computational thinking.

Offer Technical Assistance and Coaching Opportunities for Sites Off the Wasatch Front.

Although the majority of sites reported successful implementation, outcome disparities across grant programs on and off the Wasatch Front suggest opportunities to tailor additional support to those sites off the Wasatch Front. Specifically, educator outcomes at sites off the Wasatch Front were consistently lower than sites on the Wasatch Front, especially in valuing computing education. Furthermore, three of the four sites that had educator ratings meaningfully below other sites on more than one outcome were off the Wasatch Front. There is a unique opportunity for STEM AC, as an intermediary, to facilitate connections between sites and content experts to provide technical assistance or coaching opportunities to educators at sites off the Wasatch Front to help identify and address local barriers and build implementation capacity and buy-in at these sites.

Support Sites in Building Educators' Teaching Confidence.

While educators who supported the implementation of grant-supported activities reported high levels of value for computing education and enjoyment in their teaching, their reported confidence in teaching computing, technology, and engineering was meaningfully lower than the other educator outcomes. Furthermore, qualitative data suggests that some educators felt overwhelmed by the new tools used and concepts taught in grant-related activities. This was particularly challenging for those without prior computing experience. In order to support grant sites in building their educators' instructional confidence, the STEM AC is uniquely positioned as an intermediary to create opportunities that support expansion of content knowledge and pedagogical practices that further emphasize a growth mindset and normalizing learning alongside students as part of their effective instructional approaches. There might also be opportunities to provide more scaffolded support, mentoring, or peer learning networks to promote low-stakes exploration of computing tools and instructional strategies across participating sites.

Provide Support for Educators to Integrate STEM with Non-STEM Content Areas.

This year's evaluation findings showed that educators at sites that reported integrating non-STEM content areas with STEM content areas as a part of their grant activities had lower ratings across all three educator outcomes. While integrating computing across a variety of content areas is an important strategy for expanding access, educators in these areas may need more targeted support to sustain a clear computing focus and maintain alignment with the target outcomes of the grant. Educators, particularly those in non-STEM content areas, may benefit from dedicated time, professional learning and guidance (e.g., modeling, coaching) for integration efforts, with a focus on maintaining fidelity to computing learning goals. It might also be beneficial to develop model lessons or interdisciplinary

activities that retain a focus on computational thinking skills while aligning with language arts, social studies, or other non-STEM content areas. Similarly, STEM AC may expand their repository to include integrated lessons and additional resources to support educators knowledge and instructional practices. In addition, time at grantee meetings in reviewing these resources or facilitating the development of a community of practice among site educators who are interested in building their capacity to plan and facilitate interdisciplinary lessons may support building educator confidence and STEM integration efforts.

Expand Resources Available to Educators Serving Students in Special Education.

Educators working in special education contexts reported high valuing of computing education, but meaningfully lower interest/enjoyment and confidence in teaching these subjects. This pattern suggests a strong belief in the potential of computing-related learning for this population of students, which is coupled with uncertainty around implementation and how to make these activities meaningful and effective for special education students. To further support educators in these contexts, additional opportunities for mentoring or collaboration between special education teachers and educators facilitating CP experiences. These opportunities could focus on universal design for learning (UDL), differentiated instruction, resource sharing, and knowledge of assistive technologies that can specifically support computing instruction in special education settings.

Promote a Renewed Focus on Student STEM Identity Formation and Computational Thinking Development.

While both educators and students rated students' interest and excitement in computing relatively high (3.43 and 2.85, respectively, on a 4-point scale), both rated students' STEM identity and computational thinking relatively lower (i.e., educator ratings ranging from 3.09 to 3.20 and student ratings ranging from 2.74 to 2.58 on a 4-point scale). Additionally, students' perceptions of their own STEM identity were lower than their self-ratings on all other outcomes (i.e., 2.58 on a 4-point scale). Furthermore, although educators reported growth in students' outcomes (i.e., ranging from a 23.3% to a 32.3% increase across outcomes), students reported less change as a result of participation in grant activities (i.e., ranging from a 7.2% to 8.7% increase across outcomes). These findings suggest that it might be beneficial for participating grant programs to continue emphasizing hands-on problem-solving experiences that explicitly help students practice computational thinking skills and see themselves as creators, engineers, and problem-solvers in computing contexts and beyond. Similarly, implementation of reflection, self-recognition, and peer role modeling within CP activities may further support the development of STEM identities among students, which can improve their interest and confidence in STEM.

Conclusion

The UEPC's 2024–25 evaluation of the STEM Action Center's Computing Partnership Grant Program highlights the program's evolving capacity to strengthen computing education across Utah. As sites concluded their second and final year of implementation, findings reveal meaningful progress in expanding student access to computing experiences, building educator capacity, and fostering student engagement and identity in computing.

Grantee sites broadly achieved their implementation goals, often exceeding initial expectations through strategic planning, resourceful use of grant supports, and flexible program designs tailored to local contexts. Many programs addressed longstanding barriers to participation—such as access for rural and underserved populations—through intentional outreach, transportation solutions, and the creation of welcoming, student-centered learning environments. These actions exemplify how computing programs can be both inclusive and responsive to diverse student needs.

Educator growth was a key feature of this year's findings. Participants consistently reported increased confidence, enthusiasm, and a deeper valuing of computing instruction, especially when supported by sustained, hands-on practice and collaboration. Sites with makerspaces and integrated classroom activities reported the strongest educator outcomes, suggesting that authentic, embedded approaches may be particularly effective for fostering professional learning and instructional innovation. Notably, educators described learning alongside their students, developing new technical fluency, and redefining their identities as STEM educators through this reciprocal process.

Student outcomes, while more modest and variable, reflected emerging confidence, interest, and self-identification with computing, particularly when programming was hands-on, meaningful, and fostered peer collaboration. Though students' self-ratings of growth lagged behind educator perceptions, both groups noted improvements across key outcomes. Furthermore, educators frequently highlighted the transformative effect of cultivating a "culture of failure" in which students embraced trial-and-error and problem-solving as essential to learning. These environments appeared to empower students to explore STEM pathways with greater agency, resilience, and curiosity.

While the quantitative analysis revealed no direct associations between educator and student outcomes, the qualitative data pointed to important, nuanced linkages. Educators' growing confidence, instructional adaptability, and cross-curricular integration efforts shaped how students perceived and engaged with computing. These findings suggest that while effects may not be immediately measurable through standardized surveys, educator development does influence student learning in notable ways.

During this grant cycle, the CP program has demonstrated success in empowering educators, reaching students in innovative ways, and adapting to contextual challenges. Moving forward, attention to sustaining educator momentum, deepening student ownership, and expanding equity-driven practices will be essential. With thoughtful planning and strategic investment, the CP program is well-positioned to continue scaling its impact and advancing high-quality computing education throughout the state.

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Appendices

Appendix A. Grant Activity Area Descriptions

Table 3. Overview of Computing Partnership Grant Activity Areas

Focus Area	Description
Pre-K Enrichment	Pre-K enrichment includes activities that are designed to expose Pre-K students to technology and developmentally appropriate computing concepts and activities to build foundational skills for computing and computational thinking.
Makerspaces and Maker Learning	Makerspaces can take many forms, but at their core, they are focused on engaging students in design processes and maker learning. In these informal, interdisciplinary, and communal learning spaces, students become a part of a community of makers, engage in hands-on learning, and develop new skills as they iterate through the design process and leverage a variety of tools, technologies, and materials to make physical or digital products. For the purposes of this grant, these activities do not need to occur in a designated space. Instead, students might leverage materials from maker kits, mobile spaces, or maker resource libraries to engage in maker learning. Furthermore, maker activities funded through the CP grant should focus on increasing students' access to computing opportunities and building their skills and knowledge related to technology, computing, and/or computational thinking.
Out-of-Classroom (OOC) Experiences	Out-of-classroom activities and programs funded through the CP grant occur outside of the regular school day to complement or supplement regular instruction and increase student access to and engagement in activities related to computing and/or computational thinking. These activities can include extracurricular clubs, competitions, and grant-related activities embedded in after- or before-school programming.
Summer Camps and Activities	Summer camps and activities funded through the CP grant are typically held in June or July and include activities designed to increase students' access to computing opportunities and build their skills and knowledge related to technology, computing, and/or computational thinking.
Work-Based Learning Experiences	Work-based learning experiences are educational opportunities for students to learn more about computing careers, apply classroom learning in real-world contexts, and gain applied knowledge and work experiences related to computing. For the purposes of the CP grant, these can include student internships in computing-related careers, apprenticeships, and job shadows.
Near-Peer Mentorship	Near-peer mentorship activities are those that establish formal mentoring relationships among students as they engage in computing-related activities. In these interactions, one student (i.e., the mentor) typically supports educators to facilitate and guide other students (i.e., the mentees) as they engage in activities designed to build their skills and knowledge related to technology, computing, and/or computational thinking.

External Partnerships	This grant activity area relates to the intentional efforts undertaken by LEA, district, or school leadership and staff to leverage new or existing relationships with external organizations (e.g., industry, higher education, community, or other partners) to support the implementation of computing, computer science, or computational thinking activities supported by the CP grant program. This includes securing financial or in-kind support as well as collaborating with or establishing strategic partnerships with businesses, community organizations and members, and/or colleges and universities to support student access to and engagement in computing experiences.
Increasing Access & Engagement for All Students	Taking actions to intentionally increase student access and engage students with a variety of interests and backgrounds in computing, computer science, and/or computational thinking learning experiences. This can include efforts like expanding/targeting outreach activities or tailoring program activities to the interests of specific student groups based on feedback or research on how to engage various student populations in similar activities.
Increasing Alignment and Integration with Classroom Standards & Curriculum	Specific actions or processes undertaken to ensure alignment between grant-related computing, computer science, and computational thinking learning activities and the standards and curriculum taught in the classroom. This can include efforts like allocating time for educators to develop standards-aligned lessons/activities to leverage in grant funded experiences or identifying and implementing previously developed lesson plans that are aligned to state standards and curriculum.

Appendix B. Map of Data Sources Used to Answer Each Evaluation Question

Table 4. Evaluation Questions and Data Sources

Evaluation Questions	Data Sources				
	Grantee/ Site Leader Questionnaires	Site Leader Interviews	Grant Activity Focus Groups	Educator Survey	Student Survey
1. **Grant Program Progress and Influencing Factors.** How and to what extent did participating CP Grant Programs make progress toward their stated objectives and successfully achieve their objectives by the end of the two-year grant cycle? What factors contributed to (i.e., facilitated or hindered) progress and success?	✓	✓	✓		
2. **Student Access and Participation in Computing Activities.** How and to what extent did grant program activities support student access to (i.e., via offerings) and participation in computing, computer science, and computational thinking learning experiences?	✓	✓	✓	✓	
3. **Educator Outcomes.** To what extent did participation impact how educators value computing and feel confident and competent in their computing knowledge and skills (i.e., the educator outcomes of interest for the STEM AC CP Grant Program)?			✓	✓	
4. **Student Outcomes.** To what extent did participation impact how students identify with computing, report interest and engagement in computing, and exhibit computational thinking skills (i.e., the student outcomes of interest for the STEM AC CP Grant Program)?			✓	✓	✓
5. **Connections between Educator and Student Outcomes.** What was the degree of association between educator outcomes of interest (i.e., valuing of computing and computing confidence and competence) and student outcomes (i.e., computing identity, interest, engagement, and computational thinking)?				✓	✓

Appendix C. Sample Descriptive Statistics

Table 5. Site Engagement in Educator EOY Surveys and Grant Activity Focus

	# of Sites	Percent
Educator Data Collection	**14/17**	**82%**
Educator EOY Survey	13/17	76%
Educator Grant Activity Focus Groups	11/17	65%
Student Survey Site Count	**10/17**	**59%**
Program Grant Activity Area[1]	—	—
Out-of-Classroom Experiences	12/14	86%
Summer Camps	7/14	50%
Makerspace/Maker learning	7/14	50%
Pre-K Enrichment	2/14	14%
Near-Peer Mentorship Among Students	1/14	7%
Work-Based Learning	1/14	7%
Geographical Locale[1]	—	—
On the Wasatch Front	6/14	43%

[1] *Note*: Only the programs who provided data are included in these calculations.

Table 6. Educator EOY Survey Sample Descriptives

	Count	Percent
Survey Responses	**53/53**	**100%**
Educator Role[1]	**47/53**	**89%**
Classroom Educator	28/53	53%
STEM Specialist	5/53	9%
Other	1/53	2%
Media Specialist	2/53	4%
Special Education Educator	3/53	6%
District- or LEA-Level Support Staff	2/53	4%
Makerspace Specialist	1/53	2%
Computer Science Specialist	2/53	4%
Supported Activity Focus Areas[2]	**53/53**	**100%**
STEM	40/53	75%
Computer Science	35/53	66%
Non-STEM (e.g., ELA)	30/53	57%
CTE	14/53	26%
Special Education	6/53	11%
Other	4/53	8%
Target Student Grades	**53/53**	**100%**
Primary Students (PK-6)	34/53	64%
Secondary Students (7-12)	7/53	13%
Both	12/53	23%
Geographical Locale	**53/53**	**100%**
ON the Wasatch Front	23/53	43%

[1] Note: Only 47/52 educators specified their role when completing the survey.
[2] Note: Educators could select multiple response options.

Table 7. Student Survey Sample Descriptives

	Count	Percent
Survey Responses	**1,882**	**100%**
Enrolled Grade	**1,822/1,822**	**100%**
3rd	396	21%
4th	455	24%
5th	534	28%
6th	226	12%
7th	101	5%
8th	68	4%
9th	52	3%
10th	23	1%
11th	16	1%
12th	10	1%
Geographical Locale	**1/822/1,822**	**100%**
ON the Wasatch Front	749	40%

Appendix D. Sites by Location On or Off the Wasatch Front

Sites On the Wasatch Front (*N*=9)	Sites Off the Wasatch Front (*N*=8)
Canyons School District	Cache County School District
Davis School District	Duchesne School District
Entheos Academy/Tintic School District	Iron County School District
Hawthorn Academy – South Jordan	Juab School District
Jordan School District	Kane School District
Jordan – Majestic	Pinnacle Canyon Academy
Murray School District	South Sanpete School District
Salt Lake Arts Academy	Washington School District
Utah Military Academy	

Appendix E. Scale Reliabilities & Lists of Items

Table 8. Reliability Estimates for Response Scales

Scale	# Items	Respondents	Time Frame	# Valid Responses	Cronbach's Alpha
Educator Outcomes					
Valuing Computing, Technology, and Engineering Education	6	Educators	Retrospective Pre-Survey	69	0.93
			Post-Survey	70	0.86
Interest/Enjoyment Teaching Related Content	2	Educators	Retrospective Pre-Survey	69	0.95
			Post-Survey	70	0.87
Confidence in Related Teaching Abilities	2	Educators	Retrospective Pre-Survey	69	0.89
			Post-Survey	70	0.81
Student Outcomes					
Interest/Enjoyment	4	Students	Retrospective Pre-Survey	1,788	0.76
			Post-Survey	1,851	0.71
		Educators	Retrospective Pre-Survey	64	0.84
			Post-Survey	65	0.87
Computational Thinking	5	Students	Retrospective Pre-Survey	1,778	0.87
			Post-Survey	1,835	0.82
		Educators	Retrospective Pre-Survey	64	0.89
			Post-Survey	64	0.90
Identity	5	Students	Retrospective Pre-Survey	1,788	0.85
			Post-Survey	1,843	0.81
		Educators	Retrospective Pre-Survey	63	0.85
			Post-Survey	64	0.91

Table 9. Educator Outcome Items and Descriptive Statistics

Item	Start of Year (Retrospective)			End of Year (Current)	
	N	Mean	SD	N	Mean
Educator Outcomes[a]					
Valuing Computing, Technology, and Engineering Education					
It is important for students to learn about real-world applications of computing, engineering, and technology concepts and skills.	53	4.19	0.86	53	4.64
It is important for students to solve practical problems that matter to them.	52	4.21	0.85	52	4.69
It is important for students to feel like they are good at computing, engineering, and technology.	51	3.90	0.90	52	4.50
It is important for students to see other students and people like themselves successfully engaging in computing, engineering, and technology-related activities.	52	3.92	0.86	52	4.58
The development of students' knowledge and skills related to computing, engineering, and technology is essential for their academic success.	51	3.96	0.77	52	4.48
The development of students' knowledge and skills related to computing, engineering, and technology is essential for their success later in life (i.e., after graduation or in their future careers).	52	4.02	0.75	53	4.57
Composite Score	**52**	**4.03**	**0.71**	**52**	**4.57**
Confidence Teaching Computing, Technology, and Engineering					
I am confident in my ability to teach students basic computing, engineering, and technology concepts and skills.	52	3.29	1.19	53	4.17
I am confident in my ability to teach students advanced computing, engineering, and technology concepts and skills.	53	2.92	1.30	53	3.64
Composite Score	**52**	**3.13**	**1.17**	**53**	**3.91**
Interest/Enjoyment Teaching Computing, Technology, and Engineering					
I enjoy teaching students computing, engineering, and technology concepts and skills.	52	3.71	1.05	52	4.38
I enjoy finding new ways to teach or integrate computing, engineering, and technology concepts and skills.	51	3.69	0.97	52	4.44
Composite Score	**51**	**3.71**	**0.98**	**52**	**4.41**

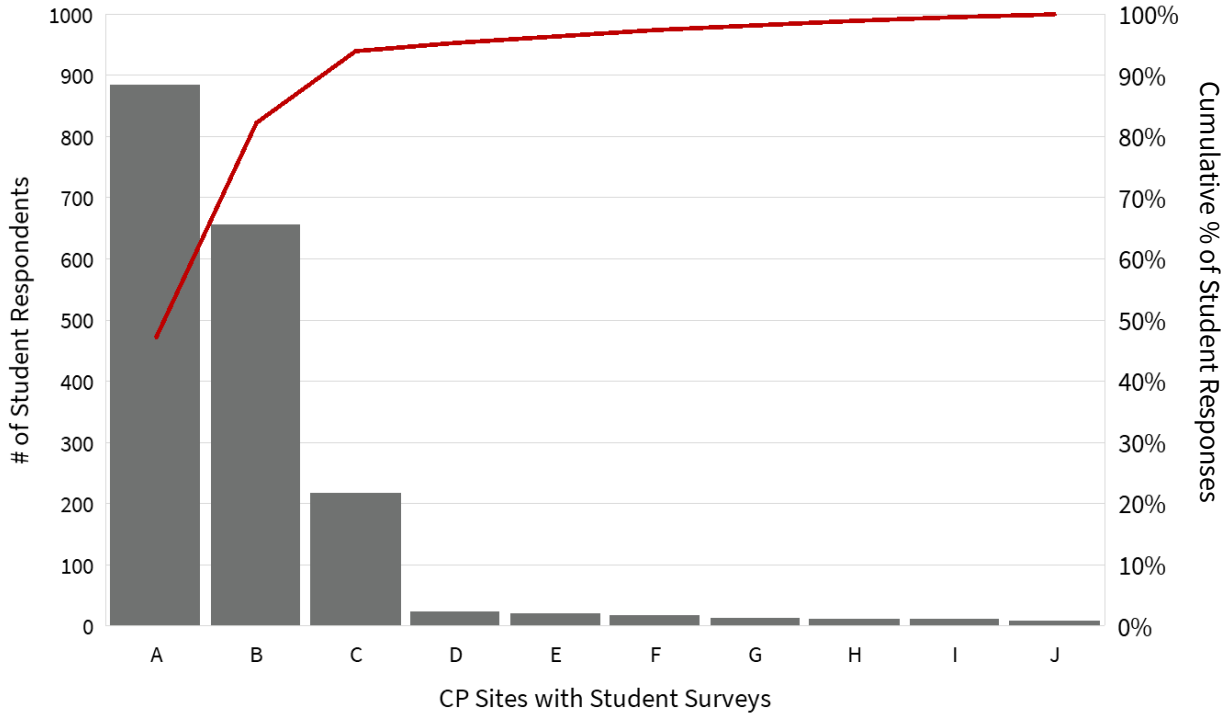
[a]All items measured on a scale of 1 to 5 ("Strongly disagree" to "Strongly agree")

Table 10. Student Outcome Items and Descriptive Statistics

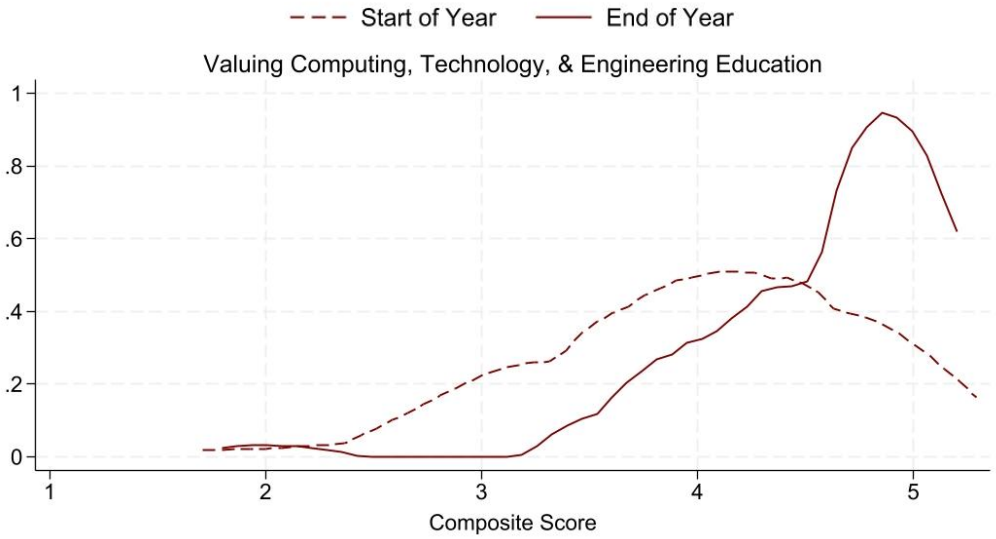
Item	Respondent	Start of Year (Retrospective) N	Start of Year (Retrospective) Mean	End of Year (Current) N	End of Year (Current) Mean
Student Outcomes[a]					
Interest in Computing, Technology, and Engineering					
I/They like designing and making things.	Educator	49	2.88	50	3.56
	Student	1,815	2.99	1,863	3.16
I/They like "tinkering" or changing things to see what happens.	Educator	48	2.75	49	3.43
	Student	1,778	2.60	1,848	2.75
I/They like "debugging" or finding and fixing issues to make things work better.	Educator	49	2.29	49	3.12
	Student	1,781	2.36	1,841	2.46
I/They like working with technology like computers, tablets, robots, 3D printers, Makey Makey, Spheros, or Ozobots.	Educator	48	2.96	48	3.60
	Student	1,805	2.72	1,850	3.13
Composite Score	**Educator**	**49**	**2.71**	**49**	**3.43**
	Student	**1,815**	**2.64**	**1,860**	**2.85**
Confidence and Skills in Computational Thinking					
I am/They are good at focusing on the most important information when solving problems.	Educator	49	2.24	49	3.00
	Student	1,772	2.58	1,842	2.81
I am/They are good at breaking big problems into smaller parts.	Educator	48	2.19	48	2.98
	Student	1,788	2.44	1,843	2.62
I am/They are good at creating step-by-step plans to solve problems.	Educator	49	2.20	49	2.96
	Student	1,776	2.52	1,825	2.68
I am/They are good at finding patterns or things that are similar to each other.	Educator	49	2.51	49	3.27
	Student	1,772	2.64	1,831	2.81
I am/They are good at using ideas or plans that worked before to solve new problems.	Educator	48	2.52	48	3.23
	Student	1,768	2.58	1,828	2.79
Composite Score	**Educator**	**49**	**2.33**	**49**	**3.09**
	Student	**1,800**	**2.55**	**1,854**	**2.74**
Student Computing, Technology, and Engineering Identity					
I/They think of myself as a maker, designer, engineer, or coder.	Educator	48	2.44	48	3.29
	Student	1,776	2.43	1,839	2.68
I am/They are a person that others ask for help when they want to make, fix, or improve something they are working on.	Educator	48	2.38	48	3.06
	Student	1,778	2.44	1,833	2.70
I am/They are a person that others ask for help when they have trouble using technology like computers, tablets, robots, 3D printers, Makey Makey, Spheros, or Ozobots.	Educator	48	2.60	48	3.27
	Student	1,784	2.37	1,837	2.60
I/They want to take classes about design, engineering, coding, computers, or other technology.	Educator	48	2.54	48	3.27
	Student	1,781	2.38	1,838	2.60
I/They want to have a job that focuses on design, engineering, coding, computers, or other technology when I grow up.	Educator	48	2.46	48	3.10
	Student	1,789	2.25	1,849	2.34
Composite Score	**Educator**	**48**	**2.48**	**48**	**3.20**
	Student	**1,800**	**2.38**	**1,852**	**2.58**

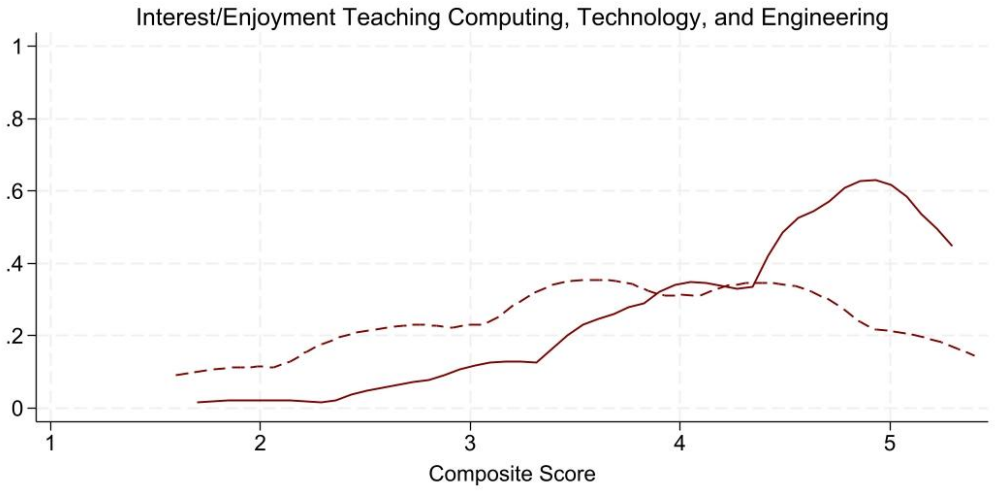
[a]All items measured on a scale of 1 to 4 ("Not at all like me/them" to "A lot like me/them")

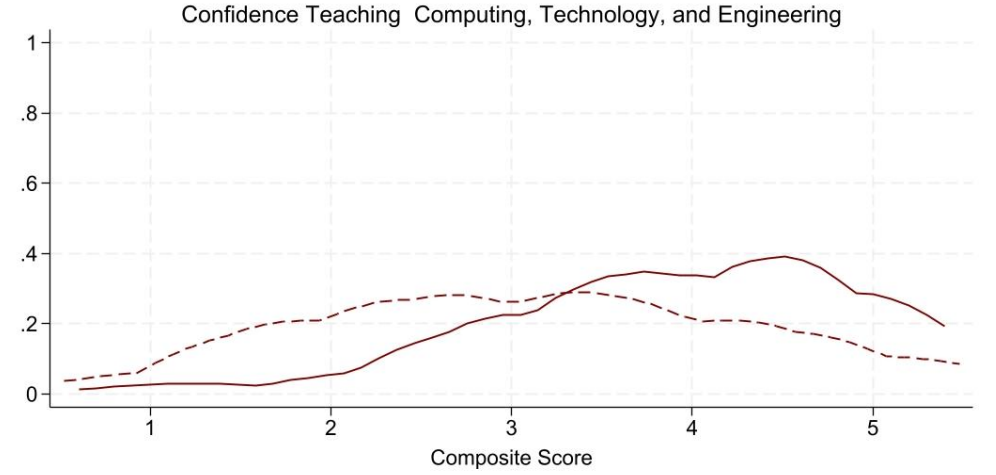
Appendix F. Student Survey Responses by Site



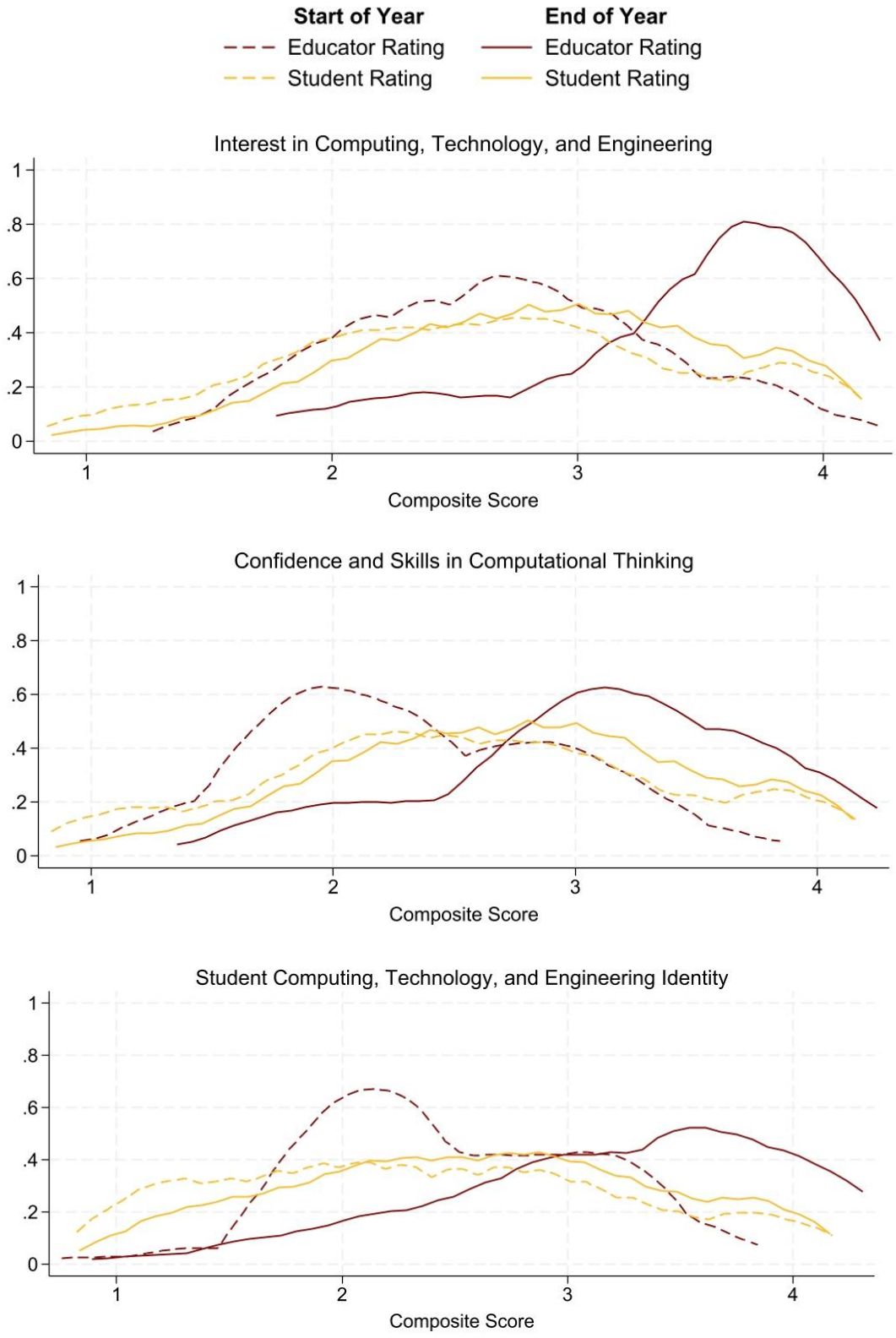
Appendix G. Distributions of Educator Outcomes at the Start and End of the Year







Appendix H. Distributions of Student Outcomes by Respondent Group at the Start and End of the Year



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