AmeriCorps Utah STEM Initiative 2021 Evaluation Report

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BOYS & GIRLS CLUBS
OF UTAH COUNTY

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INTRODUCTION

The AmeriCorps Utah STEM Initiative (AUSI) contracted with an external evaluator for the program's 2021 fiscal year. The evaluation services provided by the evaluator included the design and development of program evaluation strategies and instruments. In addition, evaluation data was provided to the external evaluator for analysis and review. The AmeriCorps Utah STEM Initiative 2021 Evaluation Report presents a description of evaluation methodologies and findings. These findings are presented in the following sections, first by individual programs then collectively as the AUSI.

AUSI PARTNER PROGRAMS & FINDINGS

The AmeriCorps Utah STEM Initiative partners with community programs in Utah County and other parts of the state. These programs provide a variety of STEM programming, which provides students with an increased opportunity to engage in science, technology, engineering, and mathematics. The purpose of this section is to present evaluation methods and findings for each of the AUSI partners.

BOYS & GIRLS CLUB PROGRAMS

The Boys & Girls Club of Utah County helps coordinate several STEM initiatives embedded in local public schools. Although these programs differed in their mode of delivery (during/after school) and specific programming, they all shared the same goal to increase students' academic achievement and engagement in STEM subjects.

A retrospective survey was administered at Cherry Hill Elementary, Geneva Elementary, Provo Clubhouse, Sharon Elementary, Sunset View Elementary, and Timpanogos Elementary. The purpose of these questions was to provide students with an opportunity to self-report changes in perceived interest, understanding, engagement, subject familiarity, importance, and difficulty of STEM-related subjects. Students were asked to report where they were before participating in the STEM program and after the stem program. These questions are reported below. Students responded to each question with an associated five-point scale.

1. How interested were you in STEM-related (science, technology, engineering, or math) subjects [BEFORE/AFTER] participating in STEM Club?
    - *Not interested, A little interested, Interested, Very interested, Extremely interested*
2. How well did you understand STEM-related (science, technology, engineering, or math) subjects [BEFORE/AFTER] participating in STEM Club?
    - *Not well at all, Slightly well, Well, Very well, Extremely well*
3. How many times a month did you participate in STEM-related (science, technology, engineering, or math) activities [BEFORE/AFTER] participating in STEM Club?
    - *Never, 1, 2, 3, 4 or more*
4. How comfortable were you with STEM-related (science, technology, engineering, or math) subjects [BEFORE/AFTER] participating in STEM Club?
    - *Not comfortable at all, Slightly comfortable, Comfortable, Very comfortable, Extremely comfortable*
5. How important were STEM-related (science, technology, engineering, or math) subjects to you [BEFORE/AFTER] participating in STEM Club?
    - *Not important, Slightly important, Important, Very important, Extremely important*
6. How hard were STEM-related (science, technology, engineering, or math) subjects for you *[BEFORE/AFTER]* participating in STEM Club?
    - *Not hard at all, A little hard, Hard, Very hard, Extremely hard*

An analysis of survey responses revealed that **87% of students reported an increase in one of the six aspects measured by the instrument**. A breakdown of these results is reported in Table 1. It became apparent in both the analysis of the data and through anecdotal reports that the lower grades struggled to comprehend the concept of a retrospective survey and recognize the nuances between questions. This finding was most apparent when analyzing the data for Geneva Elementary, where grades one through six participated in the survey. Table 2 highlights that the average perceived growth increased dramatically from first through sixth (0.13 to 0.64). Perhaps the abstract thinking required to envision how they felt before the program combined with the higher reading level limited some students' abilities to respond accurately.

Despite the limitations to the measurement instrument, valuable insights can still be gained by reviewing these self-reported measures of growth (Table 3). As previously mentioned, a substantial majority of students reported growth on at least one targeted aspect of STEM. Questions 1 (interest), 2 (understanding), and 3 (engagement) saw the most significant increase due to program participation. Although the data shows that students reported an increase in STEM subject difficulty, these numbers may be confounded by a change in the way the response options were ordered. For this particular question, the least favorable response options for the *after* question were on the right side of the response scale as opposed to the left, where they had been for the other five questions. Considering that students might have already been struggling to understand the survey, they might have continued to follow a similar response pattern without fully understanding the differences with this last question. Apart from the issues with this question's response scale, another plausible explanation for question six results is that students were presented with more frequent and challenging STEM-related problems through program participation. Overall, students had an average increase of 0.44 across all questions and 0.61 on questions 1-5. This finding means that, on average, students increased about a half a rating point on all questions by participating in the program.

Table 1 *BGC Retrospective Survey Results*

Question	Cherry Hill	Geneva	Provo Clubhouse	Sharon	Sunset View	Timpanogos	Question Ave.
1	0.35	0.34	0.7	0.89	0.79	1.00	0.68
2	0.61	0.56	0.45	0.78	0.29	1.00	0.62
3	0.68	0.67	0.20	0.11	1.64	1.00	0.72
4	0.28	0.41	0.68	0.61	1.00	0.00	0.50
5	0.00	0.55	0.79	0.50	0.92	0.50	0.54
6	-0.38	-0.27	-0.53	-0.22	-0.38	-0.75	-0.42
School Ave.	0.26	0.38	0.38	0.45	0.71	0.46	**Grand Ave. 0.44**

Table 2 *Geneva Elementary Survey Results by Grade*

Grade Average	Q1	Q2	Q3	Q4	Q5	Q6
1st Grade Average = 0.13	0.50	0.25	0.04	0.33	0.17	-0.50
2nd Grade Average = 0.24	0.10	0.44	0.49	0.23	0.28	-0.11
3rd Grade Average = 0.28	-0.19	0.20	0.68	0.72	0.57	-0.30
4th Grade Average = 0.30	0.36	0.54	0.44	0.04	0.54	-0.13
5th Grade Average = 0.53	0.68	0.89	0.76	0.58	0.81	-0.57
6th Grade Average = 0.64	0.55	0.86	1.32	0.51	0.78	-0.16

Table 3 *BGC Retrospective Survey Reported Increases*

# of Questions with Reported Increase	Student Count	Percent of Students
0	39	13.4%
1	61	21.0%
2	62	21.0%
3	61	21.0%
4	35	12.0%
5	30	10.3%
6	3	1.0%

DIXIE STATE UNIVERSITY PREP

The Dixie State University (DSU) Precollege Program (PREP) is a no-cost seven-week summer school that challenges high-achieving 6th, 7th, and 8th grade students who are interested in science, technology, engineering, and mathematics (STEM). Underrepresented, females and first-generation students are encouraged to apply. Dixie PREP motivates and prepares high-achieving students for success in school and future STEM careers. DIXIE PREP provides three summers of rigorous academic instruction. Students will build their problem-solving skills and make new friends as they participate in interesting courses, exciting field trips, and career presentations.

DSU PREP reported on eight different STEM classes offered to their participants. On average, **82% of students experienced increased academic abilities,** as demonstrated by subject-specific pre-post-tests. Students also demonstrated an **average of a 43% increase in scores** from pre to post-test across all eight subjects.

Exit surveys highlighted that the programs were both engaging and interesting. On a scale from 1 to 10, students, on average, rated DSU PREP an 8.4 in terms of how engaging and interesting the program was. Likewise, parents reported high interest and engagement of their children with an average 9.5 on a 10-point scale. Students reported statistically significant gains ($p < 0.05$) in attitudes toward all STEM subjects. Positive gains in attitudes ranged from 12% to 9%, with an average post-program rating of 71 across all survey items (on a 100-point scale).

DIXIE STATE UNIVERSITY STEM CENTER

Dixie State University STEM Center offers summer camps and after-school programs in science, math, biology, geology, mechanical engineering, coding, and others. One of their primary goals is to build and sustain an educational pipeline to prepare students and fuel the economy. To do this, they offer over a dozen k-16 STEM summer camps and after-school programs focused on hands-on STEM learning experiences. AUSI volunteers play a critical role in supporting the operation of these programs.

In 2021 AmeriCorps volunteers were involved in Cybersecurity 1, Junior STEM Academy, Junior STEM Girls, LEGO Robotics, Scratch 2, STEM Girls, and Wear Tech 2. Each of these programs has targeted outcomes. Students were evaluated at the end of each program to determine the extent to which they met an acceptable level of proficiency for each outcome. Proficiencies for individual programs can be found in Table 4. Overall, **DSU STEM Center reported an average of 98% proficiency on program outcomes.**

Table 4 *DSU Proficiency Results*

Program	Ave. # Proficient	Ave. % Proficient
Cybersecurity 1	9	100%
Junior STEM Academy	28.25	97%
Junior STEM Girls	16	100%
LEGO Robotics	9	90%
Scratch 2	4	100%
STEM Girls	15	100%
Wear Tech 2	8.75	97%
DSU STEM Center Averages	12.86	98%

JORDAN SCHOOL DISTRICT PREP

The Jordan PREP is an academically intense, mathematics-based, six-week summer enrichment program that identifies achieving middle school students with an interest and aptitude in Science, Technology, Engineering, and/or Mathematics (STEM) to motivate and prepare them for success in STEM fields.

In 2021, Jordan PREP served 66 first, 27 second, and 21 third-year students. On average, students participating in Jordan PREP increased their academic performance in all 13 subjects. Students achieved an **average increase of 46%** between pre to post-test occasions. Students scoring an 80% or above on the post-test were classified as proficient. The percent of proficient students ranged from 39% to 92%. On average, 67% were proficient in course content. Overall, **96% of Jordan PREP students demonstrated an increase in their academic performance while attending the program**.

SALT LAKE COMMUNITY COLLEGE PREP

A new program in 2021. Evaluation data to be supplied in subsequent years.

SOUTHERN UTAH UNIVERSITY PREP

SUU PREP is a free summer academic program that provides three summers of rigorous academic instruction, hands-on educational projects, challenging homework assignments, and daily career awareness for 7th, 8th, and 9th-grade students who have an interest and aptitude in Science, Technology, Engineering, and/or Mathematics fields. SUU PREP strives to provide opportunities for high-achieving students to pursue STEM studies and careers. Underrepresented and first-generation students are encouraged to apply. The mission of SUU PREP is to enhance and encourage diverse middle-school-age students' academic backgrounds and interest in science, technology, engineering, and mathematics (STEM) to motivate and prepare them to overcome the challenges in achieving a STEM degree.

SUU PREP served 64 students in 2021. Students demonstrated academic growth through subject-specific pre-post-tests. The amount of growth varied from course to course and student to student. **On average, students increased their post-test scores by 26% over their pre-test scores.** On an individual student level, **93% of students increased their academic abilities in at least one class.**

SOUTHERN UTAH UNIVERSITY STEM CENTER FOR TEACHING & LEARNING

The SUU STEM Center for Teaching and Learning is committed to bringing STEM to southern Utah through outreach events, professional development, and high-quality STEM programming. In addition, the SUU STEM Center provides support to surrounding areas through a STEM Resource Library,

tutoring/homework help, and outreach events. Although all activities impact students, the tutoring/homework program directly impacts students' understanding of math and science subjects.

Tutoring services are provided to students free of charge online for grades K-12 and in person at select high school locations. Tutoring sessions provide students individualized help with math and science subjects. The subjects and materials vary from student to student and session to session. Tutors are asked to fill out a brief three-question survey following each tutoring session. Survey questions include:

1. How much progress did the student make in their academic performance as a result of the tutoring session?
    - *None, A little, A moderate amount, A lot*
2. How well do you think the student understood the material AFTER the tutoring session?
    - *Not well at all, Slightly well, Decently well, Extremely well*
3. Do you have any other notes on the student and/or tutoring session?
    - *Free response*

Over the course of a year, the SUU STEM Center tutors helped 729 students from five Southern Utah counties with their homework for a total of 2,380 hours. From these tutoring seasons, 176 tutoring surveys were completed. Survey results indicated that in **75% of tutoring sessions, students made a lot or a moderate amount of progress**. When evaluating how well the tutoring session went, tutors reported that **83% of tutoring sessions went extremely or decently well**.

TEENS ACT

Evaluation data has not been supplied for 2021.

UTAH VALLEY UNIVERSITY PREP

UVU PREP is a free STEM Summer program for middle and junior high students, which provides three summers of rigorous academic instruction, hands-on educational projects, challenging homework assignments, career awareness speakers, and field trips. The program allows incoming 7th, 8th, and 9th (graduating 6th, 7th, and 8th) grade students who have an interest and aptitude in Science, Technology, Engineering, and/or Mathematics fields to receive accelerated curriculum in preparation for high school and higher education. UVU PREP strives to provide opportunities for underrepresented and first-generation students to pursue STEM studies and careers.

In 2021, UVU PREP served 212 students. Students participating in UVU PREP demonstrated increased academic performance as evaluated by course-specific pre-test and post-tests. Academic gains for individual courses ranged from 17% to 75%. On average, **students increased their performance by 35%.** In addition, an analysis of pre-post scores found that **99% of UVU PREP students demonstrated academic gains during the program.**

UVU PREP also administers a retrospective STEM Attitude survey to measure changes in confidence and attitudes toward STEM areas. Some of the questions with the largest gains were:

- "When something is hard, it makes me want to work more on it, not less." (17% gain)
- "I see myself as an engineering person." (17% gain)
- "I expect to do well in next year's science class." (16% gain)
- "Learning science can help me get a good job." (15% gain)
- "I am good at science." (15% gain)

AMERICORPS UTAH STEM INITIATIVE COLLECTIVE FINDINGS

The collective impact of the AUSI is evident through the apparent success of its partner programs. The analysis of available data from partner programs highlighted only a portion of how these programs impact students. This year AUSI's goal was to increase students' academic performance in STEM-related subjects. They aimed to have 78% of students realize this increase in academic performance. The attainment of this goal can be evaluated by both the direct and indirect measures of academic performance conducted by partner programs. Table 5 provides a summary of these measures. It is reasonable to conclude from these measures that AUSI has exceeded its goal with an average of 89% of students increasing academic performance based on individual program measures.

Table 5 *AUSI Summary of Annual Findings*

Program	Achievement Results
Boys & Girls Club Programs	87% of students with increases on associated measures
Dixie State University PREP	82% of students with an increase in academic performance
Dixie State University STEM Center	98% of students proficient in program outcomes
Jordan School District PREP	96% of students with an increase in academic performance
Southern Utah University PREP	93% of students increased their academic abilities in at least one class.
Southern Utah University STEM Center	83% of tutoring sessions went extremely or decently well 75% of tutoring sessions helped students make a lot or a moderate amount of academic progress
Utah Valley University PREP	99% of students with an increase in academic performance

Qualitative data was also collected to determine the degree to which AmeriCorps volunteers impacted programs and the students they serve. Again, responses were overwhelmingly positive when asked how having AmeriCorps volunteer(s) impact their ability to run their programs. Two main themes emerged from these data:

- Impossible to run the program without volunteers
    - "Without [AmeriCorps volunteers] I'm not sure our program would be able to run [our program] at all."
    - "It would not be possible to run this community program without the help of the AmeriCorps volunteers."
- Increased reach of services
    - "Without our members, we would reach half as many students, and the burnout rate of the remaining staff would probably reduce that even further. "
    - "The AmeriCorps designation helps us to recruit really talented volunteers."
    - "We've increased our program participation by 50% since working with AmeriCorps volunteers. This would not have been possible without the incredible volunteers we've been able to work with. "

Program leaders were also asked to describe the direct impact AmeriCorps volunteers had on the success and development of students. The primary theme that emerged from their responses was the impact and importance of forming personal relationships with the students. Several comments mention the positive impact these relationships have on academic and non-academic student success.

- “Our young learners look up to our AmeriCorps members as they teach after school programs each week. The members are welcoming and make the classes challenging and fun. Kids in our programs love to see members outside of the classroom and love that they know them by name and encourage them to try new things.”
- “Our volunteers spent a lot of time with students over the course of the program. They were able to bond and develop friendships and mentoring relationships that have a lasting positive impact on the students.”
- “The AmeriCorps members that volunteer with [us] really get to know their assigned group of students on an individual basis. They inspire and encourage students not only to overcome challenges in the program, but also to move forward in life knowing they are capable of doing hard things.”
- “Our AmeriCorps volunteers work directly with the students in our program. They make sure they are safe, prepared and on time for classes and labs, and help them understand the material. But even more, they are mentors. They get to know the students, talk to them about interests, goals, and ambitions. They model success in academic pursuits and highlight examples of campus life to our students. We want our program participants to feel confident on a college campus and our AmeriCorps volunteers play a pivotal role in this. We would not be able to make the impact we seek in this arena without our AmeriCorps volunteers.”