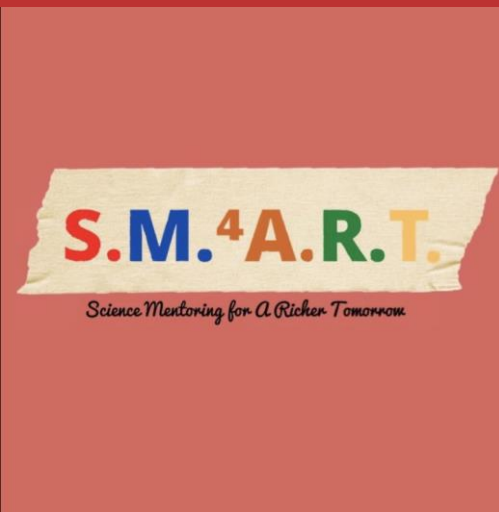


Using a Science Mentorship Program to Alleviate Education Inequality

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Introduction

- School districts with higher percentage of economically disadvantaged students correlate with lower State of Texas Assessment of Academic Readiness (STAAR) test scores. (see Figure 1)
- Owing to systematic racism and economic discrimination, many students from minority families are at risk for developing large knowledge gaps that may hinder their success in their continued education.
- Many students who fall behind benefit from personal instruction and encouragement from mentors, which can be provided in a cost-effective manner by volunteers.

Our Program

Science Mentoring for a Richer Tomorrow (SMART) is student led mentorship program at the University of Houston that pairs 5th grade students at SHEARN Elementary School with mentors from the University of Houston. We aim to provide hands on learning experiences in a fun and engaging environment to assist students in this community.

Program Methods

- To describe our program, the executive team created a Logic Model to reveal our inputs, outputs, and various goals.
- To operationalize the Logic Model, the data team created a Falsifiable Logic Model (FLM) looking at the various operations of our program and the resulting outcomes.
- Green signifies met, partially met is yellow, and not met is red.

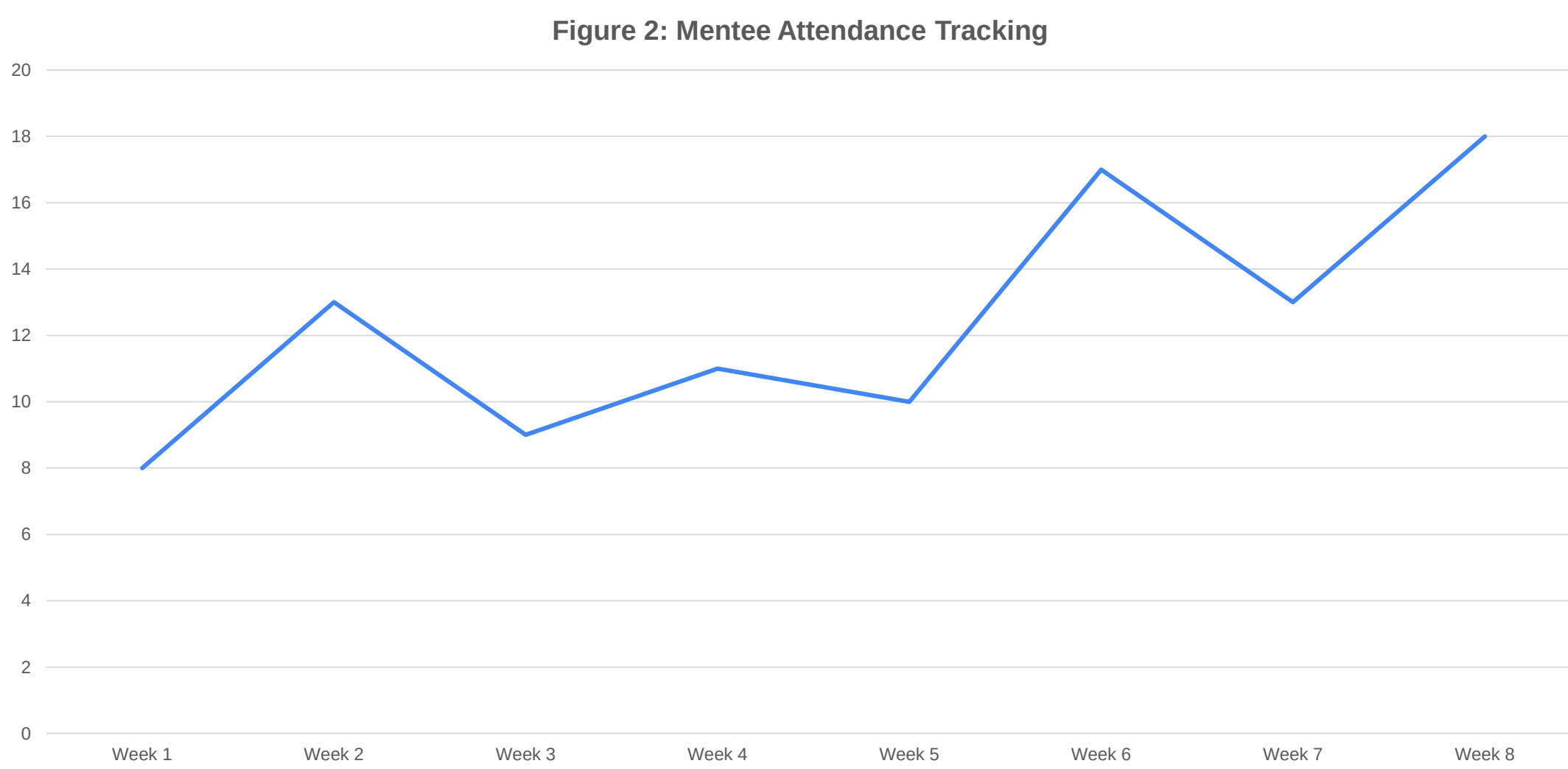


Figure 2: Mentee Attendance for Fall 2020 and Spring 2021 so far.

STAAR results: How local school districts fared

Across San Antonio, school districts with higher percentages of economically disadvantaged students had lower passage rates on the State of Texas Assessment of Academic Readiness, or STAAR. The test, which debuted last year for grades 3 through 9, is considered more rigorous than its predecessor, the TAKS.

School districts	Percent of economically disadvantaged students, 2011-12 school year	Fifth grade			Eighth grade		
		Reading	Math	Science	Reading	Math	Science
Alamo Heights	21%	91%	90%	86%	93%	77%	83%
East Central	67%	69%	69%	68%	76%	59%	61%
Edgewood	97%	60%	68%	58%	59%	48%	41%
Fort Sam Houston	36%	81%	72%	71%	82%	79%	79%
Harlandale	89%	73%	69%	67%	71%	71%	65%
Judson	64%	76%	77%	71%	76%	72%	61%
Lackland	31%	86%	89%	96%	91%	83%	83%
North East	45%	83%	82%	80%	86%	83%	75%
Northside	54%	85%	85%	80%	85%	72%	75%
Randolph Field	9%	95%	85%	91%	96%	90%	94%
San Antonio	93%	65%	66%	55%	69%	57%	51%
Schertz-Cibolo Universal City	28%	84%	86%	84%	84%	65%	80%
South San	88%	65%	62%	55%	71%	67%	56%
Southside	81%	70%	63%	54%	72%	56%	55%
Southwest	83%	67%	66%	55%	69%	43%	50%
Somerset	80%	68%	71%	59%	73%	70%	62%
TEXAS	60%	77%	77%	73%	80%	76%	70%

Source: Local school districts San Antonio Express-News

Figure 1: Relationship between economically status of students and standardized test scores of the State of Texas Assessment of Academic Readiness (STAAR).

Source: <https://www.mysanantonio.com/news/education/article/Poverty-s-impact-seen-in-tests-4285295.php>

SMART Logic Model

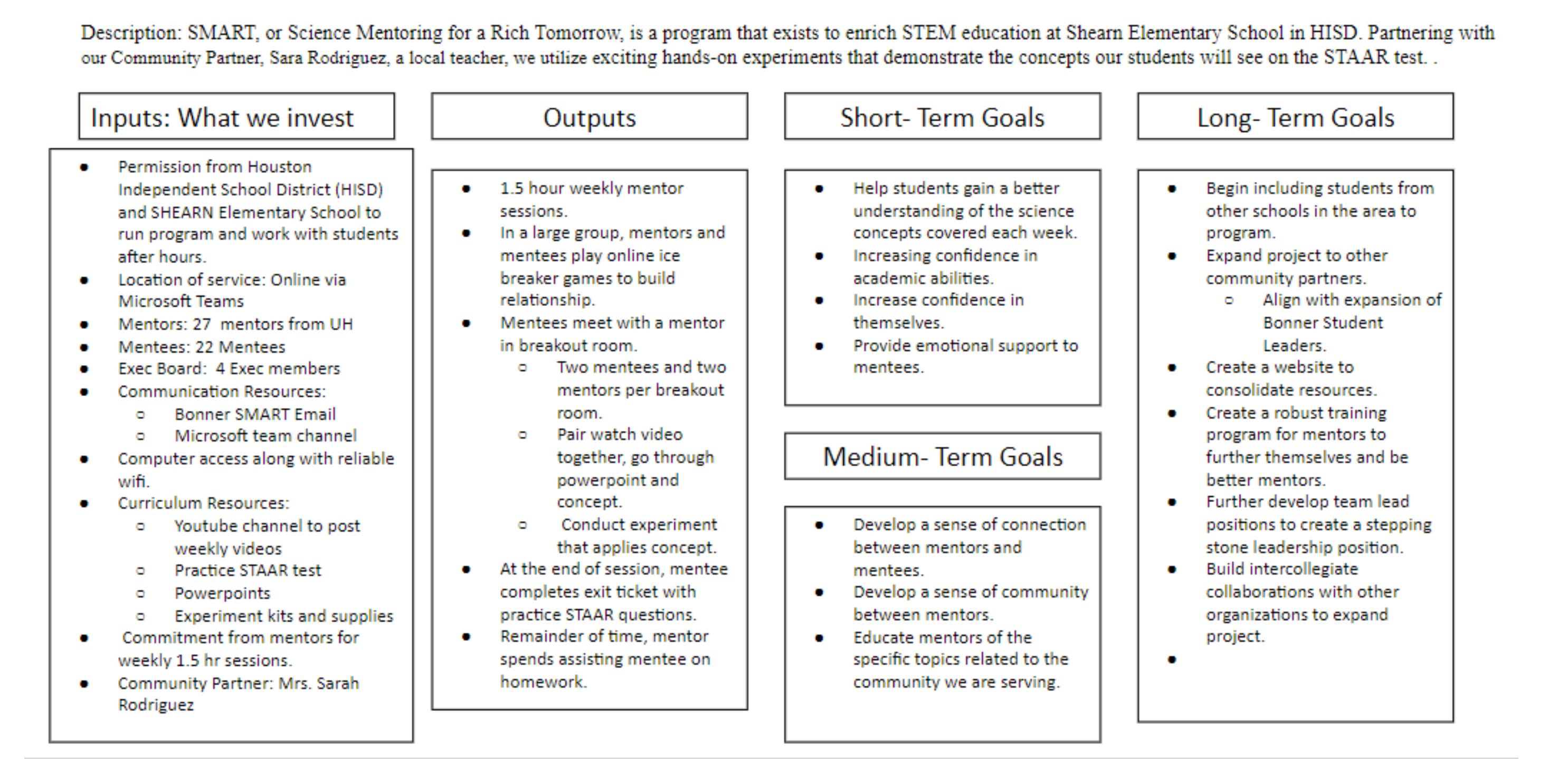


Figure 3: SMART Logic Model to breakdown program structure, partners, participants, and goals.

SMART Falsifiable Logic Model - Shearn Elementary		
Inputs (Resources)	Processes (Critical Actions)	Outcomes
27 Mentors	2 mentors are paired in each breakout room with 2-3 mentees. Pre and Post surveys from mentors.	Currently predicting that mentors are able to build relationship with mentees and mentees gain confidence through mentors, increasing mentee attendance.
22 Mentees (Varying level of attendance)	Mentees fill out exit tickets at the end of each meeting Pre and Post surveys from mentees.	Based off of feedback, mentor fidelity increases as they see increase of mentee attendance and build relationship with mentees.
Sarah Rodriguez (Community Partner)	Weekly communications through emails and phone calls between Mrs. Rodriguez and exec team.	Based off figure 2, greater levels of communication entails higher level of mentee engagement as shown from mentee attendance sheet and more personalized assistance for specific mentees.
Resources: SMART Powerpoints, Curriculum, Pre-Recorded Lesson Videos, Experiment Supplies/Bags, Exit tickets	Weekly emails communication with mentors and weekly posts on Teams.	Feedback from mentees and community partner caused a change in online platforms (zoom to teams) and a restructuring of mentee scheduling.
Location of Sessions: Zoom and Microsoft Teams	Mentors share video for the week, go through Powerpoint and help mentees with the activities. They explain content and perform formative assessment throughout the session to ensure mentee comprehension.	Mentee Engagement as reported by exit ticket participation [64% responses during the first week of Spring semester sessions, up from 29% from first week of Fall semester sessions]
Executive Team (4/4 members)	Weekly meetings between executive team.	Executive team on same page to ensure effective running of the program.
Project Leads	Project lead assist executive members with tasks and attend sessions to help supervise. -	Project leads gain leadership skills and ensure smoothness of program.
90-minute sessions 3 days/week	Obtain scores from Mrs. Rodriguez.	Mentee performance measured based on Science STAAR scores

Figure 4: SMART Falsifiable Logic Model to evaluate program. Green cells indicate program success, yellow indicate needing small improvements, and red indicates need significant improvement.

Conclusions

This program was initiated by students at the University of Houston to enrich the STEM education at SHEARN Elementary School. In previous years, SMART saw 61.9% of mentees exceed expectation on the STAAR test. Compare that to the only 35.5% of fifth graders at SHEARN that exceeded expectations.

Due to the affects of the Coronavirus pandemic, our program has shifted to an online mentoring environment which has greatly reduced our program’s effectiveness.

With this shift, our team has seen reduced mentee attendance causing lack of concrete data and several mentors have voiced a feeling of disconnection.

However, the SMART executive team has changed the implementation of our online program between Fall 2020 and Spring 2021. Instead of assigning mentees to a certain day of the week, we have allowed mentees flexibility in attendance. Now, mentees can select which of the three days to attend a SMART session.

This change has resulted in an increase in mentee attendance as seen in Figure 2 (Note: Spring 2021 begins on Week 6). The average attendance of mentees during the Fall was 10.2 mentees, however, in the Spring, so far mentee attendance has drastically increased to an average of 16 mentees.

Future Studies

In the future, we hope to collect pre and post surveys from mentor and mentees. With these surveys we hope measure changes in attitudes and social support for SMART participants. Furthermore, we also hope to collect grades and STAAR test scores from mentees to see more correlation between our program and the affect it has on standardized test scores.

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