

Strong Promise: Moving from Interest and Engagement in STEM to Real Academic Results

Evaluating Girlstart After School Participants' Academic Performance

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The semi-annual PISA conversation about how students in the United States measure up against students in other countries—the US is doing better than in past years, but still does not make the top third of 72 countries—prompts questions. Who will be our future innovators and discoverers? How can we inspire future generations to persist in STEM majors and careers, to be ready to participate in these frontiers of innovation? And how can we nurture a larger STEM workforce than what we are doing today?

Generally speaking, we know that there is a STEM crisis in the United States. We know that the nation doesn't have enough well-prepared STEM workers. We also know that we don't have enough diversity in the STEM field. Because children in the United States lag behind students in other countries in science and math, we are at risk of our future generations being completely unprepared to take on these vital STEM jobs. Even worse, 100% of girls in America are underserved in STEM, and the recent PISA report evidences a persistent gender gap. If one is female, regardless of ethnic background, one is already at risk of not opting in to STEM electives, majors, and careers; that threat increases if a child is nonwhite or from a low socioeconomic home. We are given to understand that somehow, this great nation doesn't have enough resources to prepare children for future STEM careers. But instead of talking about real-world solutions, there is chiefly mere hand-wringing about why we don't have more tools to address this issue.

It turns out, however, that we do have tools to create a stronger future: not just for the U.S. economy and innovation, but also for our nation's future families. New research shows a way to engage more children—girls, and what's more, a diverse grouping of girls—to sustain their interest, increase their skills, but also to have a demonstrable impact on their academic performance, thus retaining their participation in STEM subjects. A new study on a promising model in STEM education is now available, and its findings have strong implications for how we can sustain the interest and engagement of girls in STEM. For the second time, now across 8 diverse Texas school districts, Girlstart has secured academic performance data that shows a direct line between program participation and increased achievement in science and math. This is good news, because Girlstart is scaling up its programs to reach more girls. Girlstart is now serving 1,600+ girls with free, high-quality Girlstart After School, and 750+ girls with Girlstart Summer Camp STEM education programs.

Girlstart has been keen to understand the correlation between Girlstart program participation and formal learning outcomes, particularly academic progress, course selection, graduation rates, and college enrollment. A 2014 quasi-experimental evaluation of 2011-2013's participants in Girlstart After School in Austin and Georgetown school districts provided initial



evidence of the program's impact. In it, 85% of Girlstart After School participants "met standard" on the fifth-grade State of Texas Assessments of Academic Readiness (STAAR) test in Math, versus 70% of a matched comparison group of non-Girlstart girls. 71% of Girlstart participants "met standard" on the fifth-grade STAAR test in Science, versus 48% of non-Girlstart girls. Girlstart girls achieved Commended scores at significantly higher rates than the general school population. (Students who earn Commended Performance scores in fifth grade are commended to pre-AP math and science in middle school, thereby being on track to take Algebra 1 in 8th grade, a key indicator of future success.) Girlstart participants did in fact, subsequently, enroll in more advanced and pre-AP math and science courses.

Because Girlstart is also keen to ensure program consistency, and to check that we maintain program quality at the same time as we scale our programs, we continue to collect data as we scale. While Girlstart does not want to reduce our emphasis on informal science, we know that there is interest in understanding if and how informal, out-of-school time programs can have an impact on formal learning outcomes. So, in 2016, another quasi-experimental study (attached as an Appendix to this article) was conducted. In this, the evaluator reviewed academic performance data from 1,200+ girls across 8 school districts (Austin, Connally, Del Valle, Georgetown, Hays, North East, Pflugerville, and Round Rock). These school districts span highly disparate geographies (from Waco to San Antonio) and types of school districts (urban, rural, highly performing, low performing). The 2016 findings echoed those of the 2014 study, but on a dramatically larger scale. These findings show that informal science programs CAN have a palpable impact on science and math academic achievement:

- Girlstart girls are more likely to perform better than nonparticipants on science and math standardized tests.
- Girlstart girls are more likely to achieve high-level (Commended) STAAR science performance.
- Post-program participation, Girlstart girls enroll in more Pre-AP science and math classes than nonparticipants. They are also more likely to increase their involvement in advanced STEM courses over time, whereas nonparticipants' enrollment decreases over time.

Most significantly, Girlstart achieved these successes with groups considered highly vulnerable for academic failure; namely, economically disadvantaged students, students of color, students with limited English proficiency, and students from families with low levels of educational attainment.

So. What does this mean? It means that participation in Girlstart programs is directly linked to higher performance on math and science standardized tests. It also means that participation in Girlstart directly correlates to a pathway to Pre-AP coursework in science and math at middle school. By ensuring that Girlstart girls gain access to the Pre-AP track at middle school, more girls will take Algebra 1 in 8th grade, and be STEM-ready when they apply for college. The data also shows that Girlstart girls, after participating in Girlstart After School, do in fact enroll in



more advanced / Pre-AP courses in middle school. We believe that these findings are unique to Girlstart.

Because future college and career opportunities remain available for girls when they enter the Pre-AP track at middle school, this is a game changer. This is great news for Girlstart girls, since STEM careers are more highly compensated jobs, and 63% American families have a woman as sole or co-breadwinner. In previously conducted research, Girlstart girls, post-participation, enrolled in STEM majors at 4-year universities at very high rates (87% of Project IT Girl participants matriculated into a 4-year university, with 80% of them selecting a STEM major). Because Girlstart has been able to scale up its programs to a statewide level, this proof of promise is now positively impacting more than 1,500 girls in 19 Texas school districts, including 2 in Houston.

Girlstart After School is the largest and most robust out-of-school time program of its type in the nation, reaching more girls and schools with intensive, free, high-quality STEM education, and, with this new research, it can be definitively stated that this model is proven. There are 70+ Texas school districts that want Girlstart—and districts in 28 states across America—but sit on a wait list. But, given resources, Girlstart is ready to grow. Girlstart can bring its model of high-quality STEM education programs to more girls, and make these opportunities available. The Girlstart model can be scaled further across the state and, potentially, nationally. Girlstart is ready to bring this best in class program to communities that are eager for high quality STEM programming. Girlstart is ready to inform a pipeline of future STEM workers who can take on the world's leading challenges.

