Model Program and Practices

Talbert Middle School believes in collaboration, engagement, innovation, problem-solving, and rigor for ALL students. While the Talbert STEAM Academy was initially intended to serve a niche population of students highly interested in the areas of math, science, and engineering, the benefits of the program have impacted the overall population of students. Therefore, our STEAM Academy staff is currently working to bring this program to all students, beginning with the 2019-20 school year.

The goals of the STEAM program are three-fold: through instruction and real-life experiences, staff will introduce students to the 21st Century Skills necessary to meet the demands of future employers; provide exposure to STEAM learning that articulates into high school programs; and provide math, science, and engineering opportunities to students who may have been historically underserved in these areas.

Talbert STEAM Academy 2013-Present

The STEAM Academy was originally designed to meet the needs of an underserved student niche. These students have an innate desire to learn the “why” and “how” things work in life, which includes a desire to solve problems and think critically in and out of an academic setting. While several of these students are characterized as having less than notable social skills, together, as a cohort, they have created their own deeply connected social network. And, they are known for their high academic achievement, as well as their positive contribution to our overall school culture. While the STEM Academy struggled during its first two years in female participation, we added the “A” at the end of year two, which resulted in increased female enrollment.

The program includes one 7th and one 8th grade cohort. Each cohort travels together for language arts, history, and science, and serves an average of 33 students. Approximately 40 of the students from the STEAM cohorts also participate in the STEAM engineering elective. And, STEAM classes are mostly paperless and use a significant amount of technology. Due to this small learning community model, students have developed improved academic and social relationships, and the academy has morphed into a quasi-honors program. Much like the workplace, a high level of collaboration, innovation, and problem-solving skills results in a high level of performance. An example of such work is the 8th grade service project, which is completed through the 8th grade ELA course. Students work in teams to provide a service or create a product that solves a specific problem on campus. For example, one group developed a YouTube channel for STEAM education, and another group built stools for sixth graders to stand on to reach their lockers. It is the engineering process of creating a product to meet the needs of a collective group that leads these cohorts to an enriched learning experience.

For the last several years, real-life experiences have been valued in our STEAM program. To make these connections, students visit JPL, the USC/Wrigley Marine Science Center in Catalina, and the Ocean Institute. In addition, we have guest speakers, often parents or community members such as engineers or an astronaut from NASA, who speak to the students about their careers. Students have also had the opportunity to visit Google’s campus in Los Angeles and interview a panel of Google specialists. Moreover, students were given an opportunity to visit the Hubbs Seaworld Research Institute, the only program on the west coast of North America that raises endangered white sea bass in captivity, tags them, and releases them in the wild and tracks their population over time. The students learned about the process
and met young scientists, all of whom had different backgrounds and attended colleges all over the nation.

Furthermore, the Talbert STEAM Academy has developed a relationship with the Academy of Sustainability and Engineering, ASE, program at Edison High School. Last year, the ASE students mentored our 8th graders in engineering robotic Mars Rovers to solve a problem in space. This year, Edison is mentoring our students on a project where they are building filtration systems to filter contaminants from water. The final presentation will result in Talbert STEAM presenting their projects at the high school. Given particular parameters and challenges, the STEAM students will demonstrate that their system is capable of filtering the contaminants to meet water standards as far as turbidity, pH levels, and nitrates.

One of the best experiences for our students comes at the end of the year. Each June, 7th and 8th grade STEAM cohorts reflect on their experiences in the program at our annual Exit Interviews. Over the course of the year, students build websites that include self-selected work samples and reflections that they then share with community members who work in various STEAM professions. Representatives from Boeing, Blizzard, Google, St. Joseph’s Health, and OC Coding Academy have partnered with us for this annual event. Students experience a rigorous job interview and receive feedback on their performance. This opportunity provides students practice in presentation skills, leadership, and the ability to generalize learned skills to the outside world.

The Future of Talbert STEAM for ALL Students

School-wide instructional practices have also molded the STEAM program and likewise, ideals that have developed out of this academy have affected learning campus-wide. While there are currently eight “STEAM” teachers, the strategies that these teachers use have naturally poured over to general education courses. From a technological standpoint, it is no longer just the STEAM students who have access to Chromebooks; all English Language Arts classrooms have access to daily Chromebooks. And while the use of Google Classroom started with the STEAM team teachers, over the last few years, this tool has been shared with teachers working outside the STEAM team.

The STEAM Academy, now in its sixth year, is well established. The staff is working to implement the cultural and academic ideals of STEAM for ALL. As a collective group, the staff’s first step was the implementation of John Hattie’s work, Visible Learning. This ideology impacts all student achievement and focuses on high expectations and rigor for ALL students. Teachers also practice collective teacher efficacy, which is the belief that teachers have the ability to positively affect students through modeled behaviors. Our staff is committed to provide ALL students with the best instruction to provide an enriched and engaging learning experience.

While this successful program has produced great opportunities for some of our students the last six years, we would like ALL students to benefit from the strengths of the STEAM model. The school-wide program will include cultural and curricular initiatives that affect all students. All sixth graders will participate in the elective STEAM wheel including woodshop, technology applications, and Lego Robotics. Through the Lego Robotics rotation, students will learn the principles of the engineering process as well as participate in building the Mars Rovers to develop problem-solving skills. Additionally, students will be given options to participate in after-school STEAM enrichment opportunities including honors music programs, Globe Club, Surf Riders Club, Robotics Club, STEAM school related weekend events, outside
STEAM events, and Brainstorm STEAM classes offered through Fountain Valley Schools Foundation.

**Implementing and Monitoring**

Over the last six years, the Talbert STEAM Academy has been application based. We receive about 150 applications and approximately 66 students are selected each year. The application process includes an online application student portion, as well as a parent response and teacher feedback forms. The eight STEAM teachers review the applications very carefully, selecting students that are the best fit for the program. Data shows the program has been overwhelmingly successful. 94% of the 2017-2018 cohorts earned a grade point averages of 3.5 and above, while the other 6% maintained 3.0 averages. Proficiency rates for these students were 100% for ELA and 95% for math.

Our school vision statement and work with Visible Learning reflects rigor and high expectations for ALL. Reflecting how all student populations are served has been an ongoing goal at Talbert Middle School. An example of a population that has benefitted from such reflection is the representation of female students in the program. In the first year of the program, girls represented 22% of the cohort as compared to 53% today. English Learners are currently represented well in the program at 8%, as our EL population is 4.5% of the total population. However, there are other populations underrepresented. While 6% of the STEAM program consists of students who qualify for low socioeconomic status, the population at large is represented at 20.5%. In addition, 12% of our student population is on an Individualized Education Plan (IEP), there are no students on an IEP’s represented in this year’s STEAM program. Opening the program to every student in the future will offer opportunities to increase participation from all subgroup populations.

We have also worked to improve staff development opportunities for our STEAM teachers. Since our beginning, several of the teachers have participated in opportunities including OC STEM Ecosystem, partnerships with Explore Ocean, and DOS Certification and Program Implementation. Additionally, elective teachers have worked with OCDE for training in the areas of 3D printing and robotics. The team has also collaborated multiple times a year with Edison High School, our primary feeder school for articulation and mentorship purposes.

Perhaps the most valued professional development time for the STEAM staff are the two release days a year where the team of teachers work together to continue to evaluate the program and make improvements. Through this collaborative process, we have added themed units, created summer units of study, and increased the rigor of the overall program. The STEAM team of teachers also meet monthly to support communication and program development.

Parents are an integral part of the program. A meeting takes place at the end of the year to inform parents about the importance of STEAM education and review program components. A handful of parents are invited to attend each of the field trips to build relationships with the school, as well as be involved in their children’s education. Moving forward, students will be awarded recognition for their involvement in the STEAM program at the trimester awards ceremonies, which parents attend.

**Results and Outcomes**
The Talbert staff has developed a program that has sustained six years of success, noted by the grade point averages and state test scores of the participants. In addition to academic success, the program has elevated the overall social experience for these students, which is something we are all thrilled about.

While student achievement is a top priority of the Fountain Valley School District, signature practices have been developed district-wide, resulting in gains on the SBAC of 10% in math and 6% in language arts. While these curricular initiatives have supported Talbert Middle School in academic achievement, the STEAM program has had an impact as well. Talbert has surpassed district averages on the SBAC, with proficiency rates growing 13% in math and 8% in language arts the last three years.

Talbert’s School Plan and the Fountain Valley School District LCAP both support special populations. While the STEAM program has proven to support underrepresented females in science, it has yet to support students with special needs. Through the continued staff development in Depth and Complexity, as well as the school-wide implementation of the STEAM program, ALL students will be supported at a higher level in the classroom and be given equal access to the STEAM program.

While we are a K-8 district, Talbert has built relationships with the high school district to open STEAM learning paths for our students. The success of our program has resulted in two students meeting the President of the United States through the Broadcom Masters Science Fair process. We have also have a student from the first cohort, Sean Weiss, working with CHOC Hospital to develop a new heart valve for children.

Demonstrating program effectiveness, our students have earned numerous accolades for their accomplishments. At the Orange County Science and Engineering Fair Talbert students have been awarded 32 individual division and special recognition awards over the last three years. Talbert earned the second highest total school points at the 2017-2018 Orange County Science and Engineering Fair. 12 of our students have competed in the National Broadcom Science Fair and one of the twelve received recognition for the top 300 projects in the country. Additionally, students in Talbert’s Globe Club have presented the last three years at the International American Geophysical Union (AUG) Fall Meeting in San Francisco, New Orleans, and Washington D.C. During the annual meeting, these students have qualified and been recognized at the Bright STaRS (Bright Students Training as Research Scientists) luncheon.

Talbert sees the impact that our STEAM program has on student’s success, and will continue to provide students with enriched academics in hopes future students have similar opportunities of accomplishments.