



Life Science Summer Institute (LSSI) Evaluation

Prepared for the San Diego Workforce Partnership



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INTRODUCTION

In 2005, the San Diego Workforce Partnership, together with BIOCOM and the Southern California Biotechnology Center at Miramar College (SCBC), launched a novel program to provide high school teachers and students exposure to careers in the life sciences. The fledgling program, called the Life Sciences Summer Institute or LSSI, was initially funded by the Presidents' High Growth Job Training Initiative as implemented by the U.S. Department of Labor's Employment and Training Administration. According to its

founders, "the LSSI seeks to foster interest in the life sciences among upper level high school... students as well as high school teachers. The ultimate goal of the program is to give San Diego's future workforce early exposure to the life sciences industries."

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Over the past several years, the program has been supported entirely with private funds. The key components of the program are the "student program" which includes a one-week boot camp to prepare students with the basics of working in a lab as well as a summer-long internship program in a lab setting, and the "teacher program" which provides teachers with curriculum, experience, equipment, and contacts to incorporate the life sciences into their high school science classrooms.

The sustainability of the program, measured both by continued high enrollment by teachers and students and the financial and in-kind support provided by companies, suggests that LSSI is a successful program in meeting its objectives. The San Diego Workforce Partnership commissioned BW Research Partnership, Inc. (BW Research) to conduct an evaluation of LSSI, to measure its success, determine the factors that make it a successful program, and to determine the potential for its expansion within the life sciences cluster and to other innovative industries in San Diego.

This report includes a summary of the research findings. Throughout the spring of 2012, BW Research conducted over 30 in-depth interviews with corporate executives, staff, partners, and other related organizations. BW Research also collected survey responses from nearly 50 employers throughout the region, providing accurate quantitative results regarding the success of the program. The report, driven by strong participation from employers in the region, also provides concise conclusions and action-oriented recommendations.

LSSI EVALUATION

The employer surveys and interviews focused on measuring success, defining the benefits to participants (students, teachers, and companies) and delineating the critical components that have led to continued participation in the program by local life sciences companies.

MEASURING SUCCESS

4The LSSI program is viewed as widely successful on a variety of measures. Because its focus is on high school, students (both participants and those with participating teachers) are several years away from entering the workforce. There are no standardized credentials currently available at this level of education. The ripple effect of



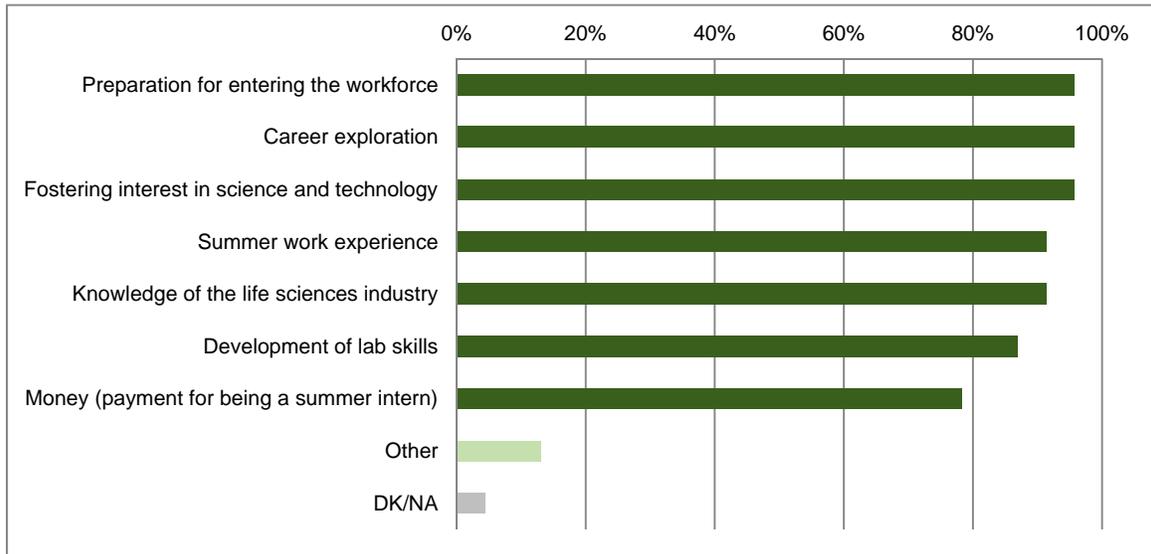
participating teachers on their classrooms is longitudinal and will take years to impact the workforce. As a result of these and other factors, success is not defined by a quantitative measure, but rather in a collection of observations of participants.

Local executives reported positive experiences based on attitudes, passion, and significantly enhanced abilities of teachers and students. This section provides an overview of the benefits observed by life sciences companies in San Diego.

Benefits to Students

The majority of participants indicated that their time and financial contributions to the program are linked to their desire for students to have increased opportunities, more career exploration, and more exposure to science. Though nearly every participant reported workforce-related benefits, such as preparation for entering the workforce (96%) and summer work experience (91%), few ranked these as one of the major benefits. Clearly, exposure to the lab environment and new career opportunities, as well as fostering interest in science and technology, are the most important benefits perceived and observed by participant (see Figure 1).

Figure 1: Benefits to Students



These themes were underscored in the executive interviews. Interestingly, several interviewees discussed the value of paying interns, with several questioning whether – in times of short supply of program dollars – the program attracts better candidates because they are paid. Though this issue may raise concerns for private employers in regards to labor laws and regulations, the issue also has several substantive points worth considering. These include reasons of social justice, ability to reach students who might not otherwise be able to participate (because they need to earn money), value of teaching high school students the connection between work and money, and most often, payment makes the students take the work more seriously and the employers take the students more seriously.

Benefits to Teachers

The Teacher Program is also a critical component of LSSI and is widely respected and appreciated by participants. In fact, most of the executives interviewed for this project

indicated that ***the teacher program is the true differentiator between LSSI and other programs.***

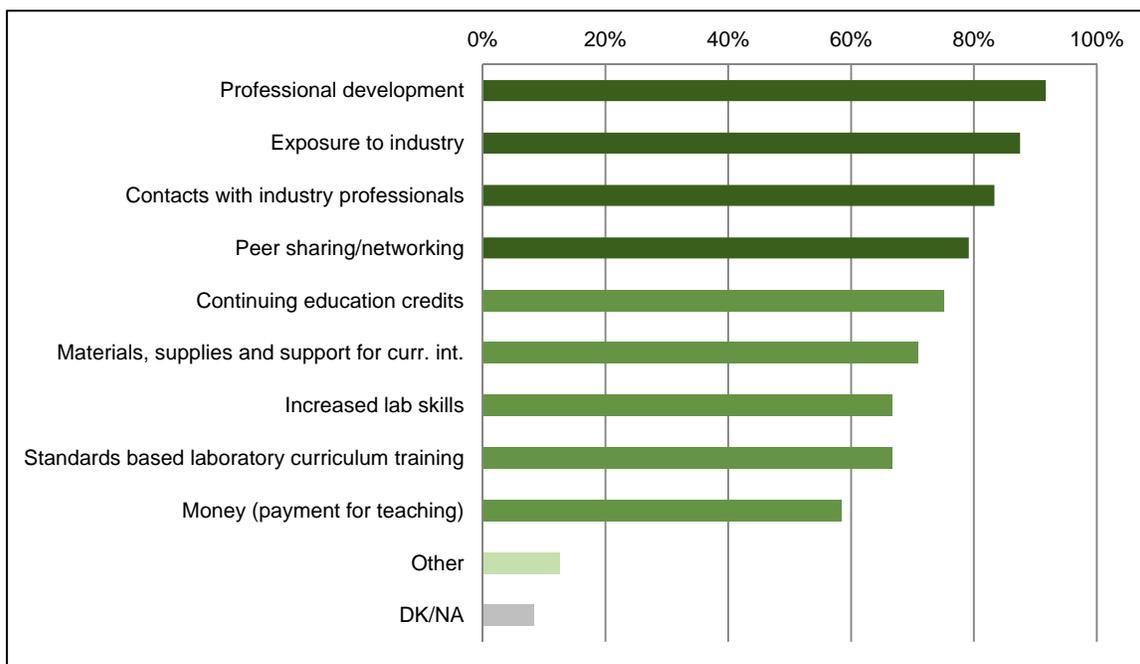
...the teacher program is the true differentiator between LSSI and other programs.

In terms of benefits to teachers, respondents to the survey most frequently cited

professional development (92%) and exposure to industry (88%). In follow up questions and in the interviews, participants reported that the program gives context and examples for teachers to use, with innovative models and real world connections that can be provided to students. Participants also noted that teachers can gain access to expensive

equipment for use in their labs (typically on loan from participating organizations) that would normally be too expensive for school districts to acquire (see Figure 2). During the interviews, most of the participants mentioned the importance of the program’s multiplier effect because each teacher in the program impacts hundreds of students over time.

Figure 2: Benefits to Teachers



Benefits to Participating Organizations

Survey respondents were asked to provide information with the research team about the benefits of participating in LSSI for their organizations. These experiences were overwhelmingly positive. Several exemplary benefits are included below:

- We get to share first-hand the teachers' experiences (positive and negative) in the classroom and we also share our education and career experiences. Everyone listens. It's been mutually beneficial and something we look forward to every year.
- This project has been very important in bringing together the local educational community and the biotech industry. It has helped to establish stable collaboration with educators and researchers. It has been key in advertising, recruitment, and basic training for high school students...
- This program provides a chance for our employees to give back. Since they are giving talks and teaching modules, it helps their communication skills. It also reminds us why we love science.

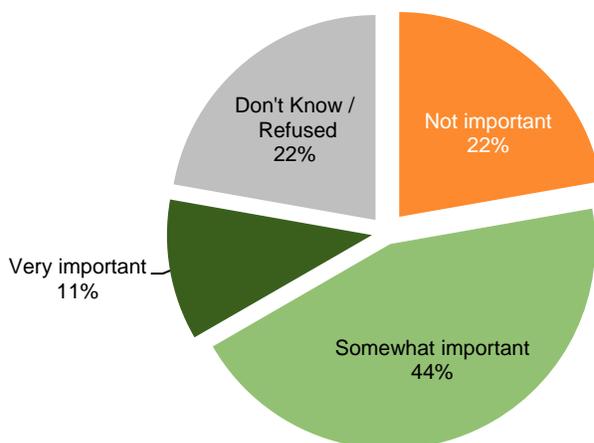
- The program is important. It allows us to reach out and give back to the community by inspiring young people to pursue careers in science. It provides our post-doctoral researchers critical mentoring experience. It helps to ensure a future pipeline of research scientists.
- Reputation as a progressive and supportive company, committed to improving the future for STEM students.

CONTRIBUTING SUCCESS FACTORS

BW Research explored several potential success factors in the interviews and surveys. Initially, it was presumed that there would be several indicators that could predict success relative to the continuation of LSSI as well as its expansion into other clusters. These factors were policies, motivation, BIOCOM/industry support, and use of interns.

Policies

Policies relative to volunteerism or funding were not deemed very important to the participants (even though between 38-56% of firms had policies relative to each area of the program), with the exception that private companies shared that their policies regarding minimum age of interns (18) preclude them from accepting high school interns. With the exception of this policy, the research team does not believe that absence or presence of policies regarding volunteerism is a critical component for other sectors to replicate success. Though 55 percent of those who have policies deemed them somewhat (44%) or very (11%) important, respondents noted that their reporting as such was due either to the limitations on taking interns or pay (see Figure 3).

Figure 3: Written Policies and Decision to Participate

In a similar line of questioning, few employers reported calculating a monetary value for their participation. In fact, far from the triple-bottom line analysis that we were expecting, employers were calculating their cost not their benefit, as they are required to take up lab space, pay interns, give donations, or other outlays of time and money.

Participation Drivers

The research team asked a forced-response tradeoff question to determine whether the majority of participants are motivated by community service or perceived, actual value to the company. The answer is overwhelmingly the former. In fact, 100 percent of respondents noted that their participation is driven by community engagement rather than benefits to their companies. In the executive interview phase, the research team spent significant time discussing these responses.

The most common justification for this answer was that with high school students being far from entering the workforce, any direct benefit received by the company is a long way off. The myriad factors that can contribute – after LSSI – to whether a student will become a life science worker not only take a long time but take many twists and turns, suggesting that the path for direct benefit to the company is harder for employers to see – especially because it requires a high school student to remain in San Diego for college or return thereafter.

This seems at odds with the finding that 93 percent of respondents reported “supporting education” as a reason for participating; 86 percent for “improving science literacy,” and 71 percent for “improving the pipeline of workers” (82% said “community engagement”) (see Figure 4). However, during the interview process, it became clear that the driving force behind the participation is the desire to improve science literacy and education because of a passion felt by life sciences workers in San Diego. Many expressed wishing science courses to be more relevant for this generation than it was for their own.

So while employers recognize that their involvement may improve the labor pool down the road, their real motivation is a passion for science education.

Figure 4: Reason for Participation



BIOCOM

BIOCOM is a critical component to the success of LSSI; however, several respondents suggested that it could do even more to help the program. The survey results were surprising in that only 50 percent of respondents reported that BIOCOM's involvement influenced their decision to join the program. Upon interviewing executives that reported that BIOCOM did not factor into their decisions (32% of all responses), the general theme was that even if BIOCOM did not influence their decision to participate, they still deemed their participation critical. In other words, the organizations would still be

involved without BIOCOM, but cannot see how the program would work without them.

At the same time, the San Diego Workforce Partnership was ranked the most important organization to the success of the program, followed by the

...the personal commitment and dedication of SDWP staff is the principal reason why the program works.

Southern California Biotech Center at Miramar and then BIOCOM. Repeatedly, interviewees noted that **the personal commitment and dedication of staff** is the principal reason why the program works.

Interns

The single greatest obstacle to LSSI is the ability to place interns at local companies. A majority of companies reported that they have policies prohibiting taking interns under the age of 18, precluding nearly all of the LSSI student participants from applying. As a result, the non-profit laboratories are the principal locations for students to gain experience. Though this basic research is critical for students' growth, the many private sector activities that are not conducted at the non-profits, such as sales, marketing, distribution, manufacturing, etc., are absent from the program.

The internship challenge is not one with an easy answer. Primary concerns include liability and value, and employers noted that policies often come from the top and are unlikely to change.

EXPANSION POTENTIAL

One of the primary objectives of this evaluation was to determine the potential to expand LSSI within the life sciences cluster as well as to replicate it for other industry sectors. The method for collecting data for this component of the study was two-fold. First,



current LSSI participating employers were asked for feedback (in the survey and in interviews) about the potential to expand LSSI within life sciences and also for suggestions for other industries in San Diego that might be good candidates for an LSSI-type

program. Second, a smaller sample of employers from other industries were surveyed and interviewed to determine whether they had the necessary components required for successful adoption.

PREDICTIVE SUCCESS FACTORS

There are several predictive success factors that are important to consider when contemplating expansion. They include:

1. **Passion for the industry and education.** The single most important factor reported by stakeholders and participants is passion. Employers are engaged because they are passionate about laboratory work, math and science education, and life sciences.

2. **Employers who will accept interns.** If private sector employers cannot accept high school interns, then a non-profit organization must fill the gap.
3. **An engaged industry association.** Respondents noted that the program cannot function without BIOCOM support. Similar engagement will be required in another sector if expansion is to be successful.
4. **Partnership with academia.** LSSI leverages existing partnerships and programs at the Southern California Biotechnology Center. This partnership is critical for the intern boot camp, curriculum development, teacher mentoring, and other components.
5. **Focus on underserved youth.** Participating employers do not see financial gain in the program (and in fact, see costs) because high school students are so far removed from the workforce. The participating firms see the program as an important community service and the focus on underserved youth is important to them.
6. **Complex content focused on math and science.** LSSI works because it provides new, potentially more interesting ways to learn science. Any expansion must leverage an industry's exciting application of math and science principles to encourage participation.

EXPANSION WITHIN LIFE SCIENCES

The research suggests that LSSI could be expanded to include more of the life sciences spectrum of activities. Specifically, respondents noted that the medical device industry and pharmaceutical firms could play a greater role in the mix of supporting employers. Respondents suggested that the value of this enhanced participation would provide even greater opportunities for students to witness the breadth of activities in life sciences, including sales and distribution, manufacturing, engineering, and other functions. Some respondents noted that some students who do not have aptitude for lab work might be well suited for engineering or other functions that still require math and science skills. Of course, the limiting factor remains the willingness of private companies – regardless of industry segment – to accept high school interns.

EXPANSION TO OTHER CLUSTERS

LSSI participating firms had several suggestions for industries that have strength in San Diego, rely on science and math skills, have ample career opportunities for exploration, and other factors indicative of success. Specifically, they suggested:

- Engineering;
- Clean Tech;
- Information and Communications Technologies or ICT (specifically, wireless);
- Industrial Biotech;
- Defense/Aerospace.

The second phase of the research relative to expansion included surveys and interviews with firms in these targeted industries. The survey responses come from firms in engineering, ICT, defense, and clean technology. The findings indicate that there is a shared desire among firms to replicate LSSI for engineering occupations across a diverse set of industries.

Of the 21 firms that completed surveys, none currently have high school interns. Only one firm reported funding programs related to high school students and three reported involvement with preparing high school teachers. Roughly half of the respondents who knew reported that their firm has a policy restricting interns to be over 18 years of age.

These results suggest that there are likely no competing programs (that include industry experience and internships) if a new program for engineering were developed, however, there is an engineering-focused program that has similar goals and some overlapping activities, called Project Lead the Way (PLTW). PLTW offers educational curriculum and

training for teachers at a university setting, as well as a summer academy for middle and high school students. The critical difference between PLTW programs and LSSI is the industry placement for both groups of participants.

At the same time, the majority (75%) actively promote employee volunteerism with their

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firms. About half of the interviewed firms said that this is formalized in a volunteer or outreach program.

Prospective employers were also asked about their perceptions about student preparedness. 75 percent of firms reported that students were either totally (35%) or somewhat (40%) unprepared in terms of science preparation (see Figure 5), and nearly 80 percent totally (32%) or somewhat (47%) unprepared in terms of math readiness (see Figure 6). Respondents also noted that career exploration, hands-on experience, and targeted curriculum for high school classrooms are the most important items to improve science and math education at the high school level, with hands-on internships the most highly ranked of all choices.

Figure 5: Student Science Preparation

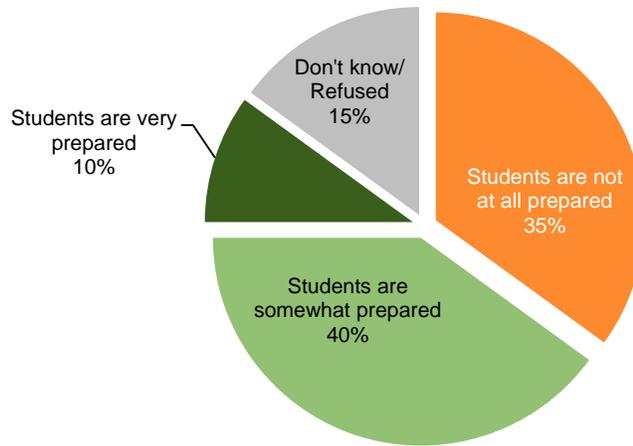
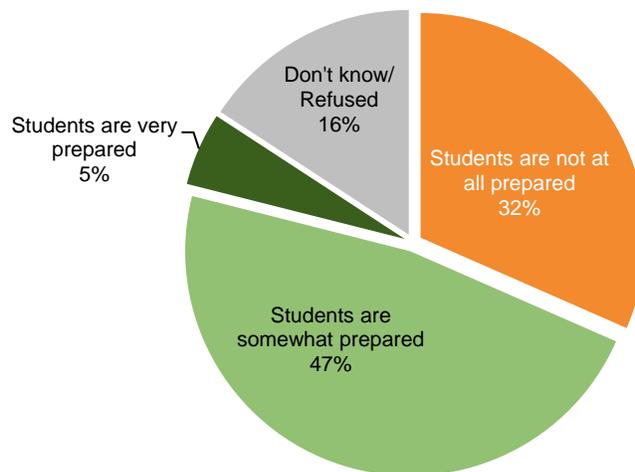


Figure 6: Student Math Preparation



Surveyed firms were also asked about their interest in various components of an LSSI-type program. When asked about interest in a program to provide internships to high school students, the plurality (42%) reported that they are somewhat interested, followed by “don’t know” and not at all interested (each at 26%), and very interested (5%) (see Figure 7). Regarding the teacher program, 37 percent reported no interest at all, followed by 32 percent with some interest, and 11 percent reported that they are very interested in such a program (see Figure 8).

Figure 7: Interest in Internship Program

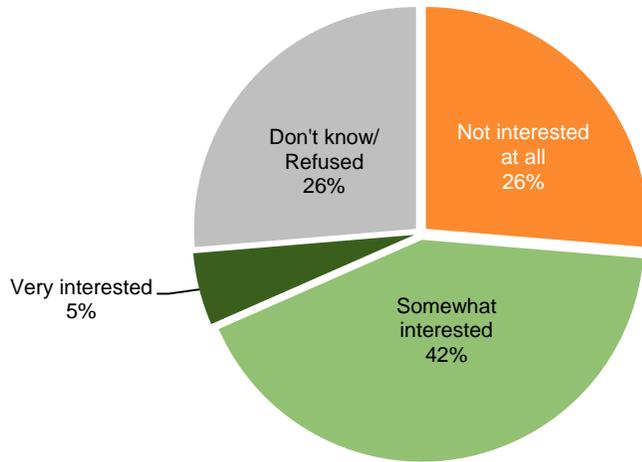
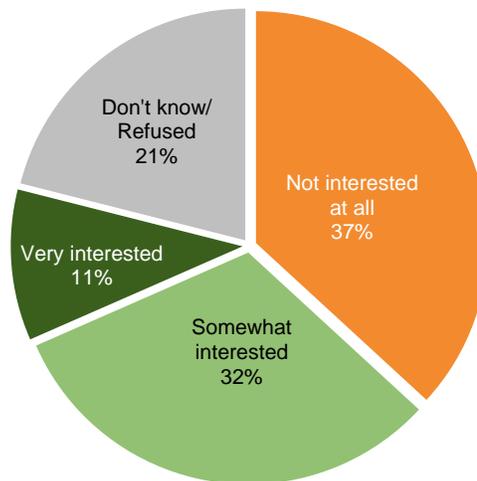


Figure 8: Interest in Teacher Program

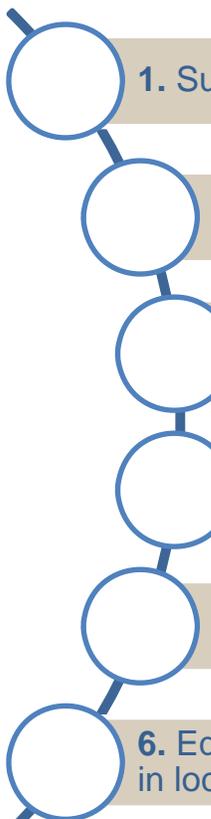


Despite the small sample, the findings suggest that there is plenty of room for a replicated program; however, significant work will need to be done to prove value to a skeptical and somewhat disinterested audience of firms in other sectors.

CONCLUSIONS AND RECOMMENDATIONS

The Life Sciences Summer Institute received rave reviews from its participating companies and partners. The evidence provided for the success includes positive student and teacher outcomes, lasting relationships and partnerships, and continued monetary and in-kind support for the program. There is also strong passion related to the program and many committed individuals who strive to make LSSI succeed.

Reasons for success indicated by research

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1. Successful partnerships with industry, facilitated by BIOCOM
 2. Strong partnerships with Southern California Biotech Center at Miramar College and Grossmont College
 3. Dedicated staff at San Diego Workforce Partnership
 4. Passion by employers and other participants for expanding science education and experience
 5. Attracting and working with disadvantaged students
 6. Equipping teachers with sustainable curricula to impact students in local high schools.

Recommendations for improvement

- 
1. Find new teachers and new methods to attract teachers, perhaps with school-year incentives
 2. Incorporate medical devices and pharmaceuticals more into the program (as opposed to a biotech- or basic science-heavy approach)
 3. Expand the program to college freshmen (more companies can take 18 year olds and the students are still in need of career exploration)
 4. Expand opportunities to include non-laboratory positions that still rely on science.

Next Steps

1

- Market the success of LSSI and develop pitch materials based on the findings of this report and leveraging quotes from company executives. This will help demonstrate the value of the program and its potential for success.

2

- Identify key champions. Ideally, these champions will include an industry association and a community college. Given the lack of interest by local associations in the research process, this may be a significant challenge in San Diego that will need to be determined early.

3

- For engineering-specific projects, partner with PLTW to augment its existing programs with successful elements from LSSI, such as industry experience for teachers and students.

4

- Develop an internship program for college freshmen. This college program would be useful because it circumvents the minimum age threshold while still capturing students who are actively exploring career opportunities.

5

- Conduct an ideation session on how to find opportunities for high school students in San Diego. Despite its reported importance, few firms are willing to take high school students. Without this key piece, however, the program is limited in how it can provide career exploration and hands-on skills. In life sciences, the laboratories are able to fill the openings, and without more private sector commitment, it must be determined who would do so for an engineering program.

6

- Identify funders to ensure that student and teacher stipends can be offered to participants.